ENGINEERING NEWS-RECORD

A McGRAW-HILL PUBLICATION

SEPTEMBER 29, 1955

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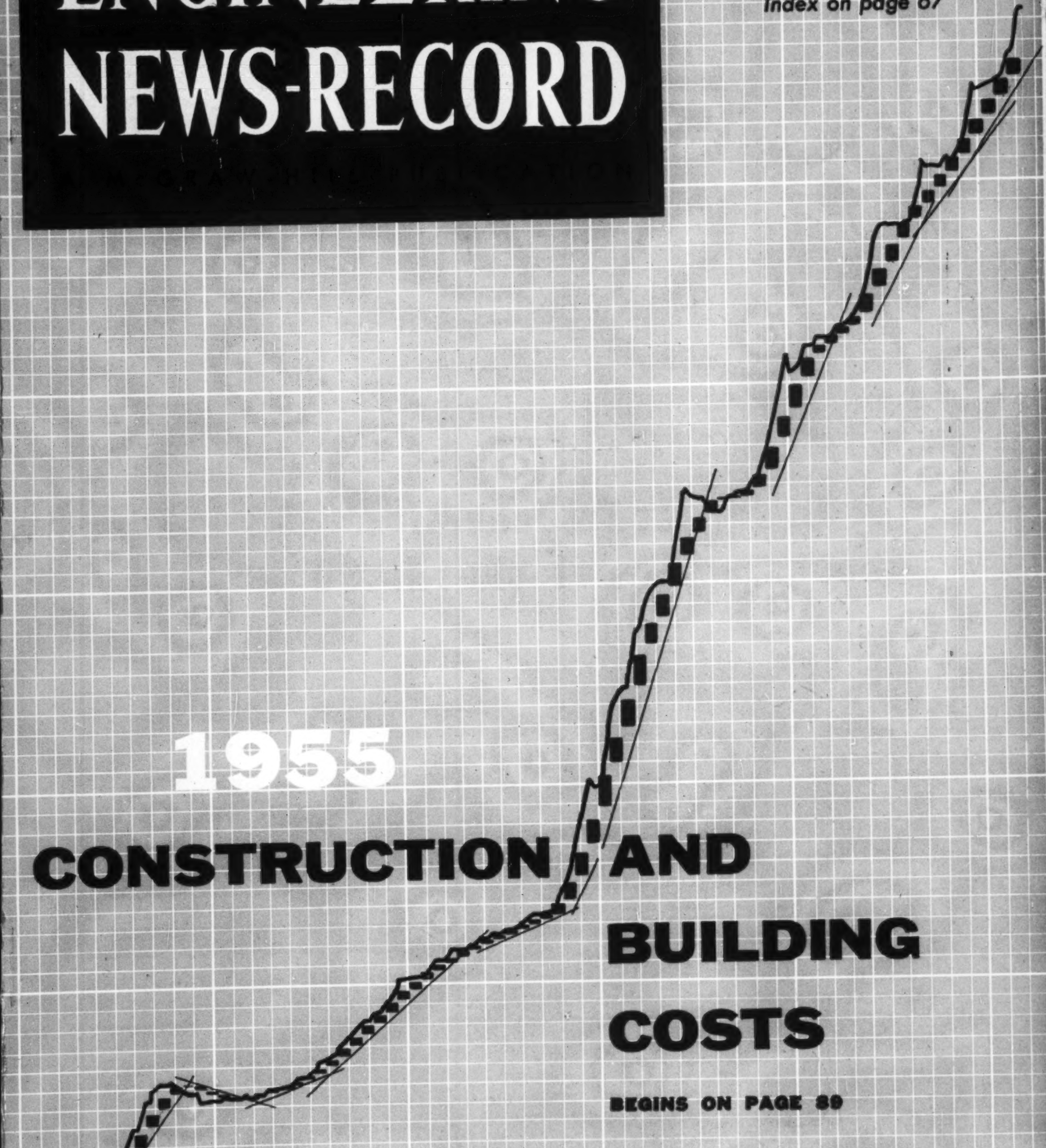

1955

CONSTRUCTION AND BUILDING COSTS

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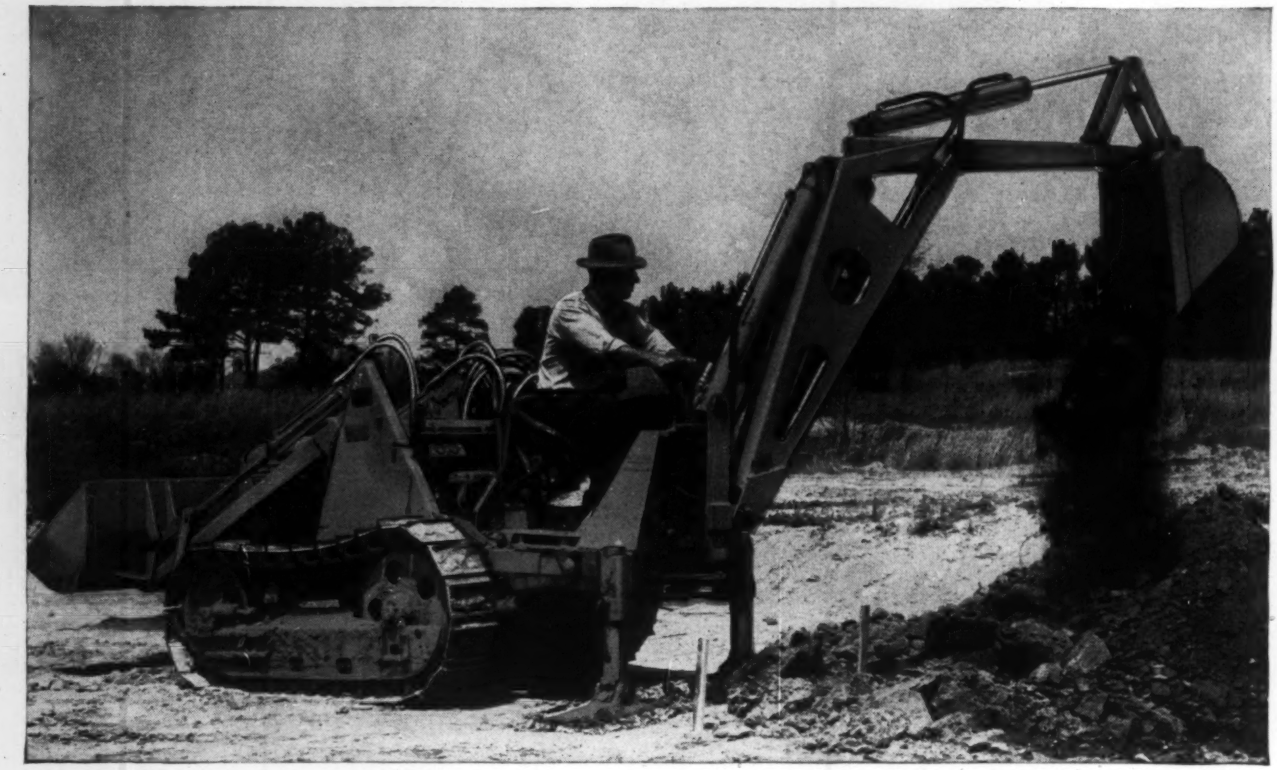


New Oliver Jet Trencher for OC-3 Loader hooks up or detaches in 90 seconds

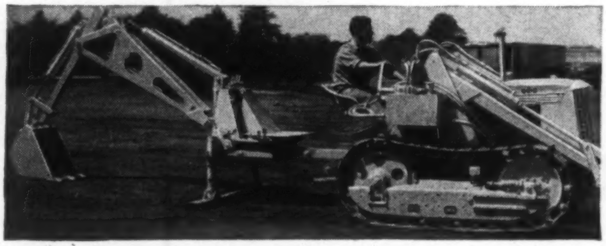
Exclusive 2-point hitch does the trick!

This new Jet Trencher is the perfect addition to the famous Oliver OC-3 Loader. It digs to 12 feet and lifts to 11½ feet—adds extra versatility without limiting tractor maneuverability or loader operation.

The exclusive hydraulic 2-point hitch makes hookup and removal a simple, one-man operation from the tractor seat. When the trencher is removed, the hitch holds the loader counterweight or quickly takes a number of handy attachments—scrapers, scarifiers, etc.

All new in design and construction, the Jet Trencher places all stress and strain on the trencher frame, not on the tractor, Its new mounting, offset to the side of the tractor, gives unmatched visibility and permits close parallel digging to walls, foundations. Full 180° boom swing gives straight side dumping.

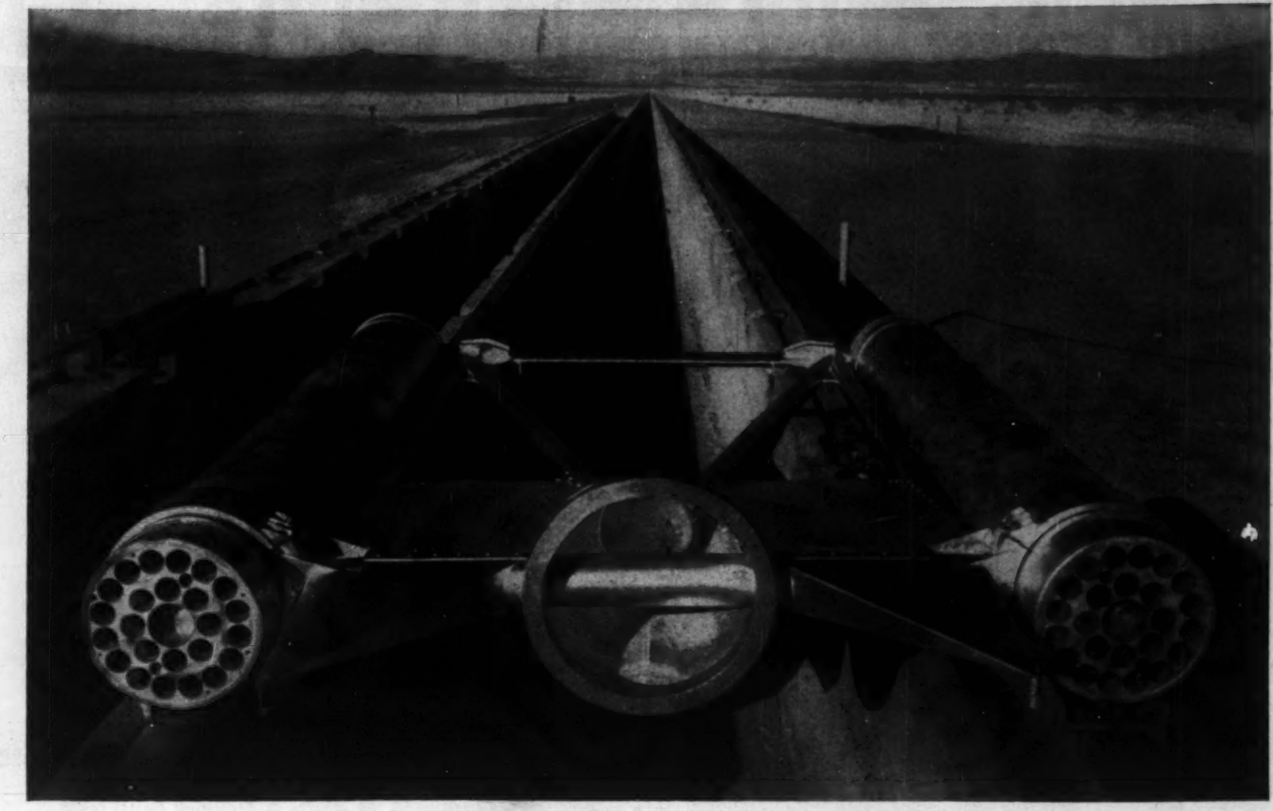
Working from the loader hydraulic system, the Jet Trencher has powerful down pressure for digging through tough soil. Hydraulic control gives smooth, cushioned operations and insures long-life, low-upkeep operation. See this new trencher and OC-3 Loader. Ask your Oliver Industrial Distributor for a demonstration.



Hydraulic 2-point hitch is adjusted to fit slots on sides of trencher as tractor is backed into position. Snap-on fittings connect hydraulic lines—seat is swung around and trencher is ready to operate. When not attached, trencher rests, as shown here, on stabilizer blade and bucket.

THE OLIVER CORPORATION
400 West Madison Street, Chicago 6, Illinois

a complete line of industrial wheel and crawler tractors



Traffic on this "railroad" moves at 2100 mph

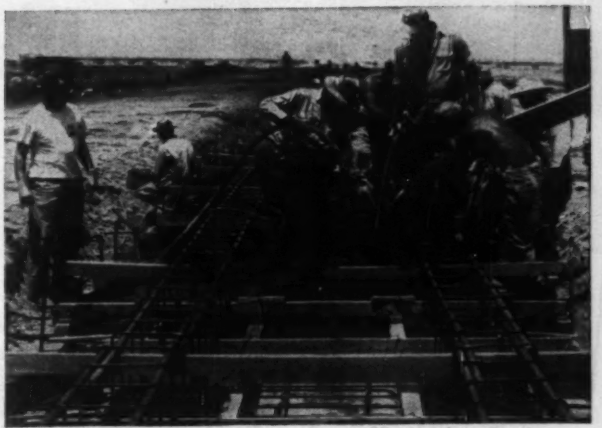
At China Lake in the California desert is this Supersonic Naval Ordnance Research Track — Snort for short — used for captive-flight testing at supersonic speeds of guided missiles, rockets, projectiles and other devices related to national defense.

Snort is a remarkably aligned standard-gage track, 4.1 miles long. Test devices fly over the track on runners, rather than roll, at speeds as high as 2100 mph, roughly three times the speed of sound. At top speed more than a mile is needed to stop the jet-propelled carriage.

The heavy rails were laid to a horizontal tolerance of 0.06 in. and a vertical tolerance of 0.036 in. Rapid acceleration and deceleration develop tremendous up and down loads on the track. To take care of these stresses, the rails were imbedded in a heavy H-shaped reinforced-concrete continuous beam and fastened by specially developed anchors.

In building this concrete beam to its required strength more than 680 tons of reinforcing bars rolled by Bethlehem Pacific Coast Steel Corporation, Bethlehem's West Coast subsidiary, were used. Laid down in intricate patterns, the reinforcing bars, plus careful concreting, contribute both to the track's precision and its rigidity.

Bethlehem reinforcing bars, used on so many important concreting jobs from Coast to Coast, are made exclusively from new-billet steel, of known analysis. They come in size ranges from number 3 to 11, with deformations meeting ASTM Spec. A-305. They are cut to length and bent in our shops, and reach you bundled and tagged, with bar lists included, ready for instant placing.



Pouring concrete for supporting beam of Snort. 680 tons of reinforcing bars, rolled by Bethlehem Pacific, Bethlehem's West Coast subsidiary, were laid in intricate pattern for full 4.1-mile length of track.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM REINFORCING BARS

BETHLEHEM
STEEL

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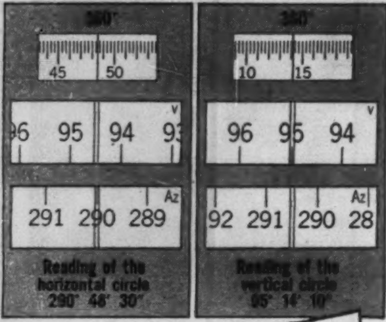

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Reading of the vertical circle 95° 14' 10"

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T-1 TRANSIT (Standard Model) $700
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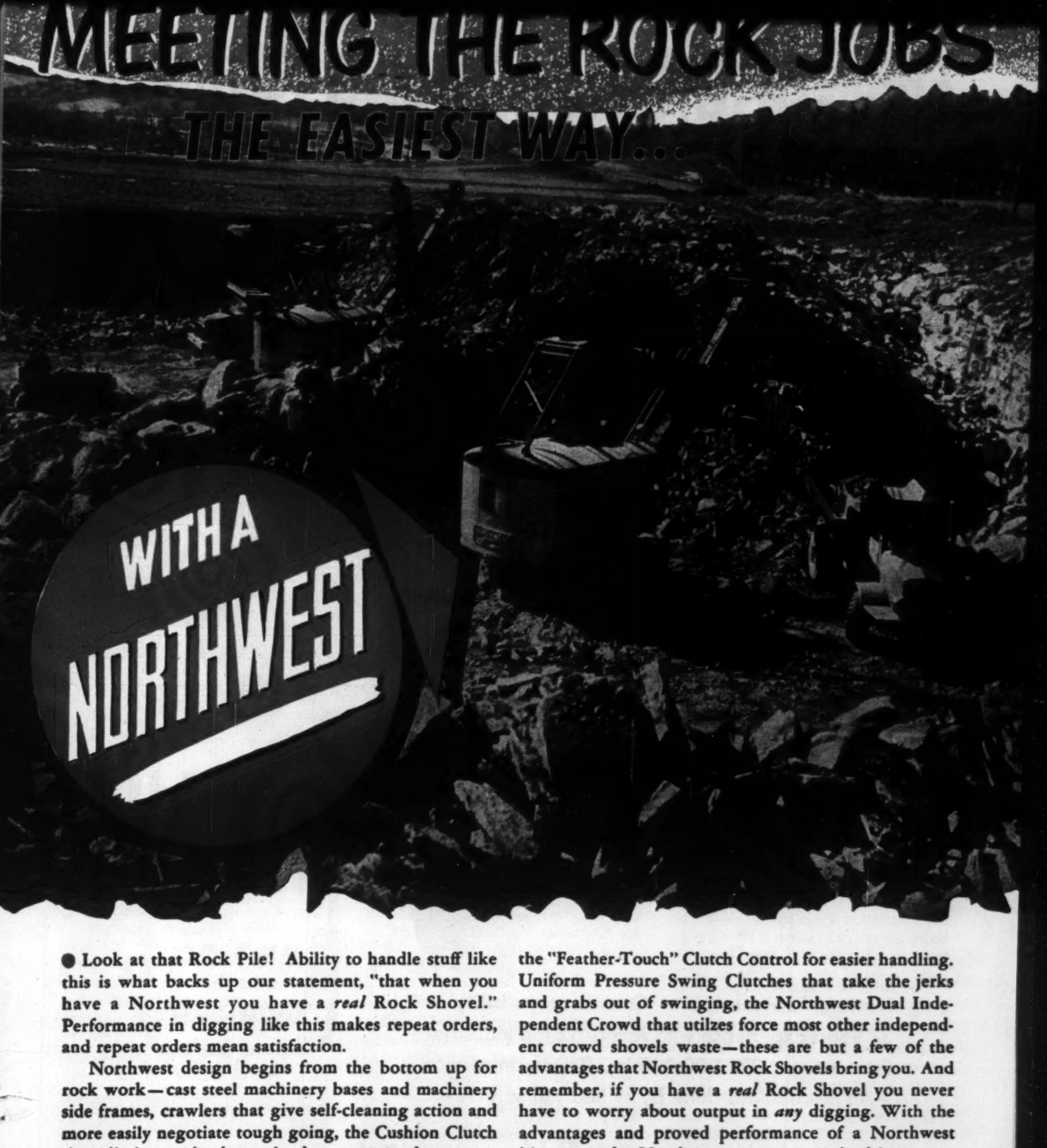

● Look at that Rock Pile! Ability to handle stuff like this is what backs up our statement, "that when you have a Northwest you have a *real* Rock Shovel." Performance in digging like this makes repeat orders, and repeat orders mean satisfaction.

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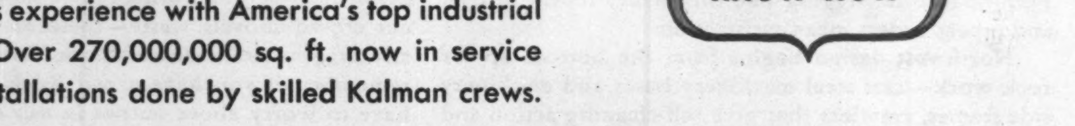

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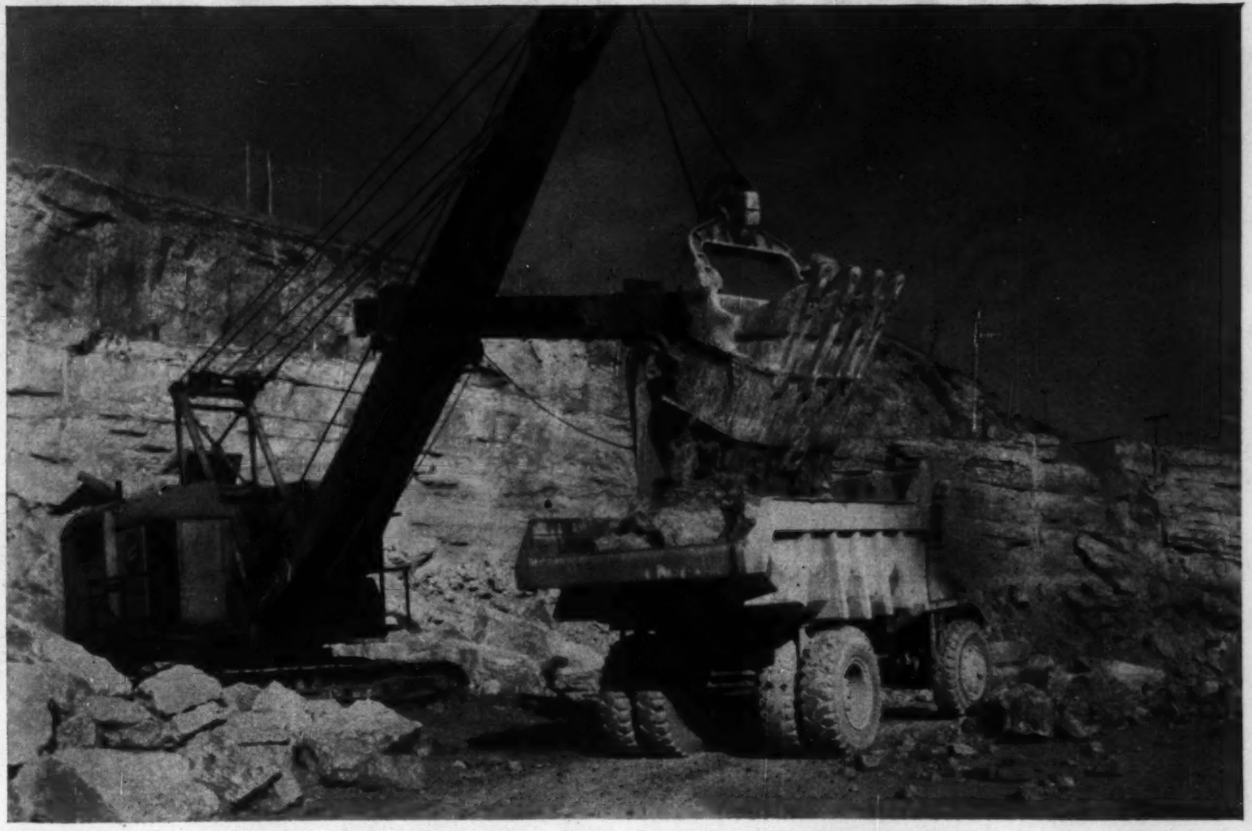

All-Nylon tires roll 5,000 hours on original tread, user reports

SUPPLYING a host of materials to the construction industry—from concrete and brick to crushed stone and gravel—is the job of the Consumers Co., of McCook, Ill. Trucks without springs carry 15 tons of rock over the unsurfaced road from diggings to crusher. This means the tires must take all the shock.

B. F. Goodrich *all-nylon* tires do the job, Consumers Co. reports. They give up to 5,000 hours of service, and are 50% less susceptible to tire-killing, production-stopping blowouts.

How nylon saves you money

Nylon is stronger than ordinary cord materials, withstands double the impact and resists heat blowouts and flex breaks. That's why the B. F. Goodrich *all-nylon* tire body outwears even its extra-thick tread, can be recapped over and over! You get more original hours of service, more hours of service per recap.

Your B. F. Goodrich retailer has a complete line of *all-nylon* off-the-road tires. Find out from him how you can save money, no matter what kind of work you do. His address is listed under Tires in the Yellow Pages of your telephone book. Or write *The B. F. Goodrich Co., Tire & Equipment Division, Akron 18, Ohio.*

ALL-NYLON Rock Logger and Universal tires under 15-ton load on the way to the rock crusher.

CONSUMERS trucks travel up steep ¾-mile road from diggings. *All-nylon* tires resist bruising and sidewall scuffing.

Specify B. F. Goodrich tires when ordering new equipment

RESEARCH KEEPS
B.F.Goodrich
FIRST IN RUBBER

ENGINES CLEAN, UPKEEP COSTS

ISBELL Construction Company, Reno, Nevada, operates mechanized equipment worth many millions of dollars. Diesel equipment alone, for example, is valued at nearly $3,000,000. For many years now, Isbell has lubricated engines in this vast array of equipment with Texaco. The company explains that —

> **"Considering the tough jobs we do where our equipment is exposed to dirt and bad weather, Texaco gives our engines outstanding protection. Our engines run clean, bearing wear is at a minimum and down time is negligible. Our maintenance costs are low, too."**

Isbell relies on the famous *Texaco Ursa Oil* series — a complete line of lubricating oils especially refined to make diesel and heavy duty gasoline engines give *more power* with *less fuel* over *longer periods* between overhauls. Whatever the size, type and speed of *your* engines, or fuel used, there is a member of this famous series exactly right to assure these benefits.

For chassis lubrication, Isbell uses *Texaco Marfak* — it assures longer lasting protection against wear and rust. It won't squeeze or jar out of bearings, seals out dirt and moisture.

For wheel bearings, Isbell uses *Texaco Marfak Heavy Duty* — it protects against dirt and moisture, seals itself in, assures safer braking. No seasonal change required.

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For transmissions and differentials, use *Texaco Universal Gear Lubricant EP*. It assures efficient performance, longer gear life.

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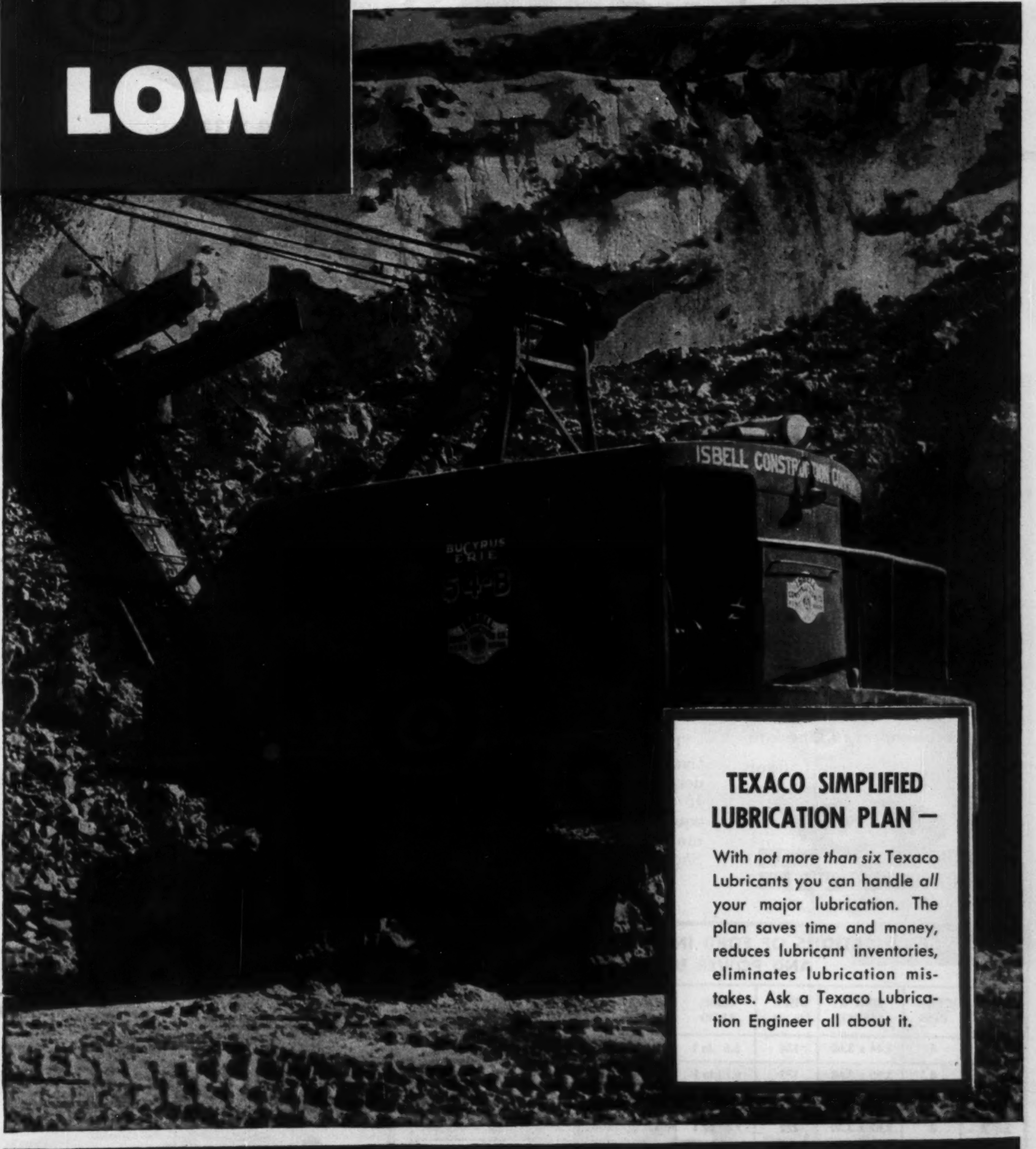
ISBELL CONSTRUCTION COMPANY
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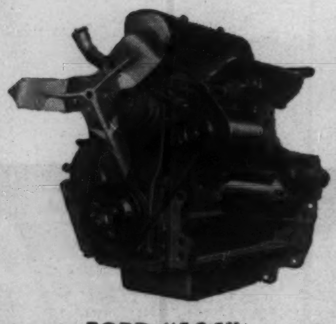
TEXACO SIMPLIFIED LUBRICATION PLAN —

With *not more than six* Texaco Lubricants you can handle *all* your major lubrication. The plan saves time and money, reduces lubricant inventories, eliminates lubrication mistakes. Ask a Texaco Lubrication Engineer all about it.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT



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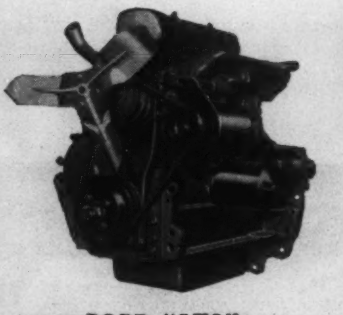

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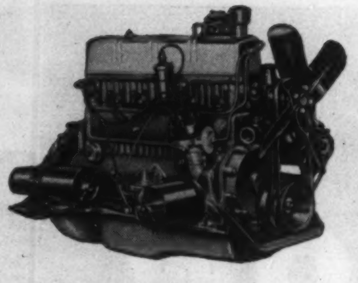

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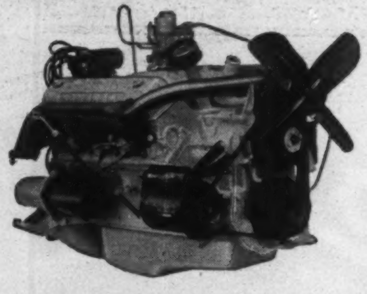

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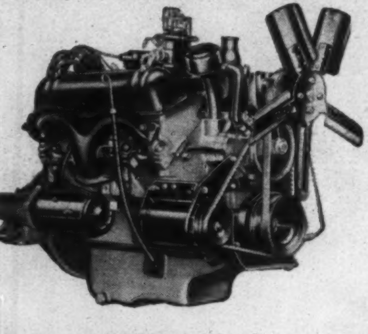

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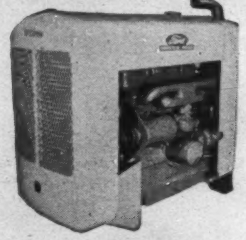
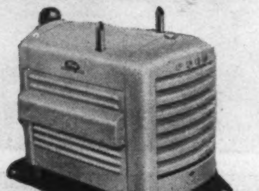


FORD Foot Mounted Power Unit



FORD Skid Mounted Power Unit

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172	4	3.90 x 3.60	172	6.75 to 1	61 @ 2800	148 lbs.-ft. @ 1400 rpm
223	6	3.62 x 3.60	223	7.8 to 1	107 @ 2800	202 lbs.-ft. @ 2000 rpm
272	8	3.62 x 3.30	272	7.6 to 1	131 @ 2800	249 lbs.-ft. @ 2400 rpm
332	8	3.80 x 3.66	332	7.5 to 1	160 @ 2800	308 lbs.-ft. @ 2300 rpm

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"The Amvit Joint is built in, ready for installation. Since no special preparations are needed, the line is laid quickly and easily. Immediate backfilling is possible."

When the pipe is "pushed" together, the joint is in constant compression. Water cannot force its way in or out, thus preventing costly ground water infiltration or root penetration.

Amvit Jointed Clay Pipe is just one of the many products manufactured in our plants across the nation. American Vitrified Products Company also produces concrete pipe, clay pipe, flue liners—both glazed and unglazed, and clay liner plates.

For more information, write or call American Vitrified Products Company, National City Bank Building, Cleveland, Ohio, or our office nearest you.

The Amvit joint is made of a new acid resistant plastic material with rubber characteristics. Like the pipe, the joints will not be harmed by any condition of underground service. The pipe is simply pushed together. The trench is then ready for backfilling.

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BRIXMENT

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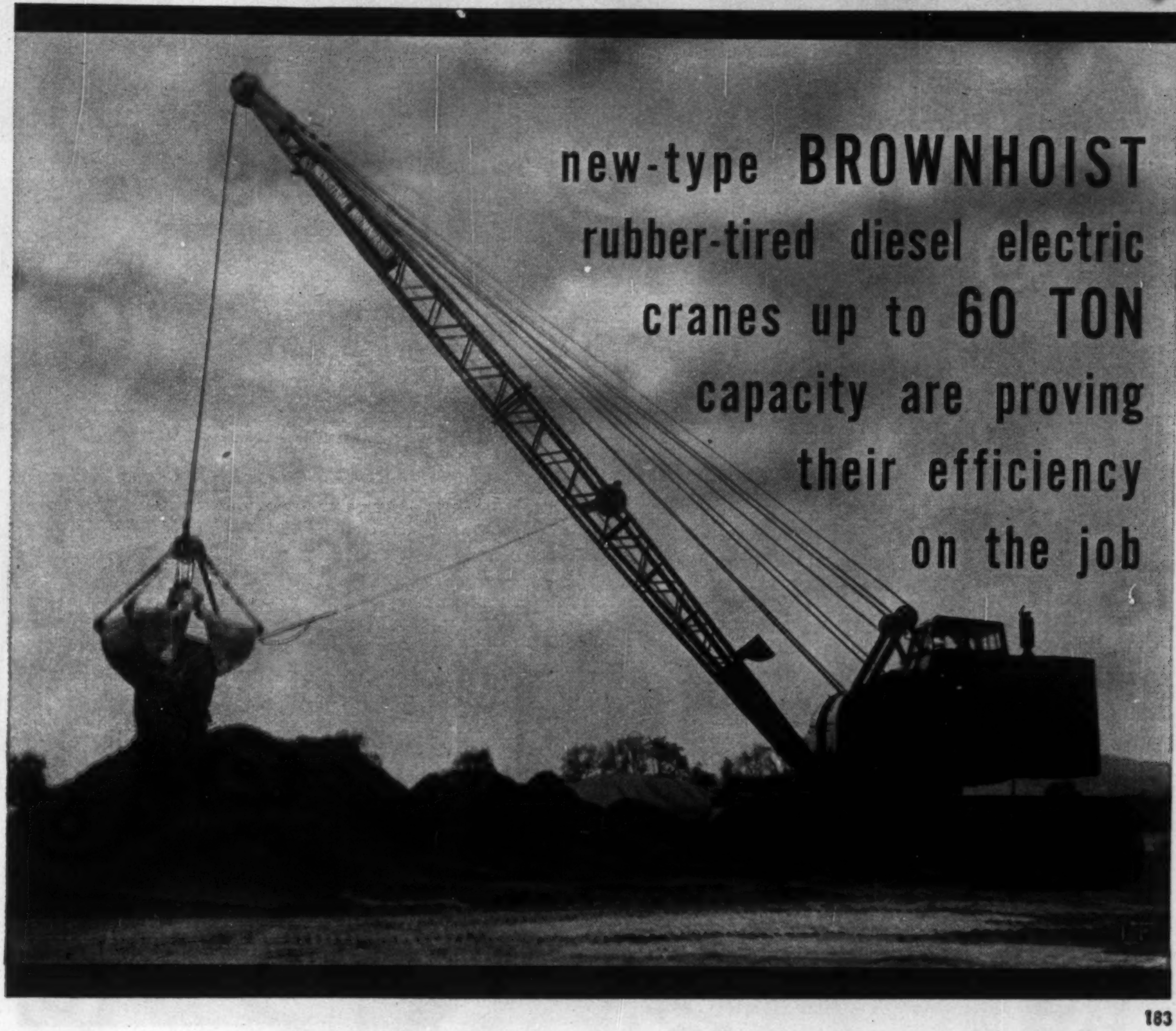
BETTER PLASTICITY

BRIXMENT
A WATERPROOFED CEMENT FOR MASONRY
BRIXMENT

To build the best possible concrete-block walls, the bricklayer must use plastic mortar. The mortar must be plastic enough to stick to the long head joint. It must not drop off the edges of the block when the block is swung up, and lowered into place. It must remain plastic long enough to enable the bricklayer to tap the block down to the line, easily and accurately.

Brixment mortar provides this necessary plasticity. Moreover, it stays soft and plastic long enough to let the bricklayer level, plumb and straighten the unit and adjust it to its final position in the wall before the mortar stiffens.

Louisville Cement Company . . . Louisville 2, Kentucky


new-type BROWNHOIST
rubber-tired diesel electric
cranes up to 60 TON
capacity are proving
their efficiency
on the job

183

BROWNHOIST MATERIAL
HANDLING EQUIPMENT
GIVES A LIFT TO
AMERICAN INDUSTRY

The new Brownhoist Wagon-Cranes are specifically designed to do an outstanding job wherever high mobility and high capacity are required. You'll see them at work performing heavy duty jobs in mines, quarries, steel mills, for railroad and lumber operations and for many other large industries. Equipped with dynamatic clutch, anti-friction bearings at all essential points, power steering, electric travel and electric rotation. Mounted on a 12 wheel crane carrier capable of speeds up to 8 miles per hour, the unit can be operated by one man from easy-to-reach controls. Economical to operate. Available in capacities from 25 to 60 tons. For specification folder or further details, get in touch with our nearest representative or write us at Bay City.

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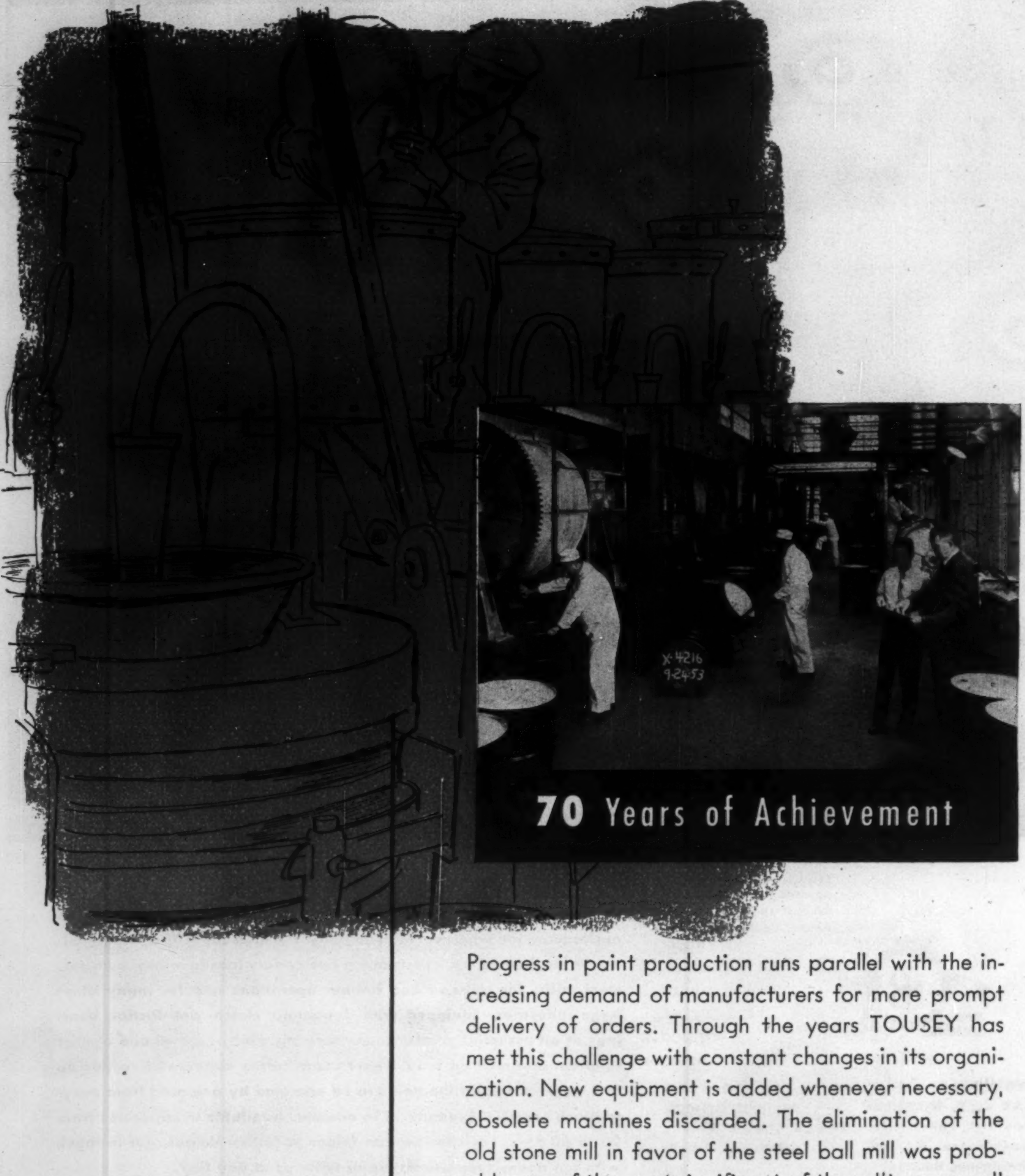

Progress in paint production runs parallel with the increasing demand of manufacturers for more prompt delivery of orders. Through the years TOUSEY has met this challenge with constant changes in its organization. New equipment is added whenever necessary, obsolete machines discarded. The elimination of the old stone mill in favor of the steel ball mill was probably one of the most significant of these "turn-overs." This policy of keeping abreast of the times, regardless of cost, is one of the many reasons TOUSEY finishes are the finest.

Let us help you with your finishing problems—write today.

TOUSEY PRODUCTS
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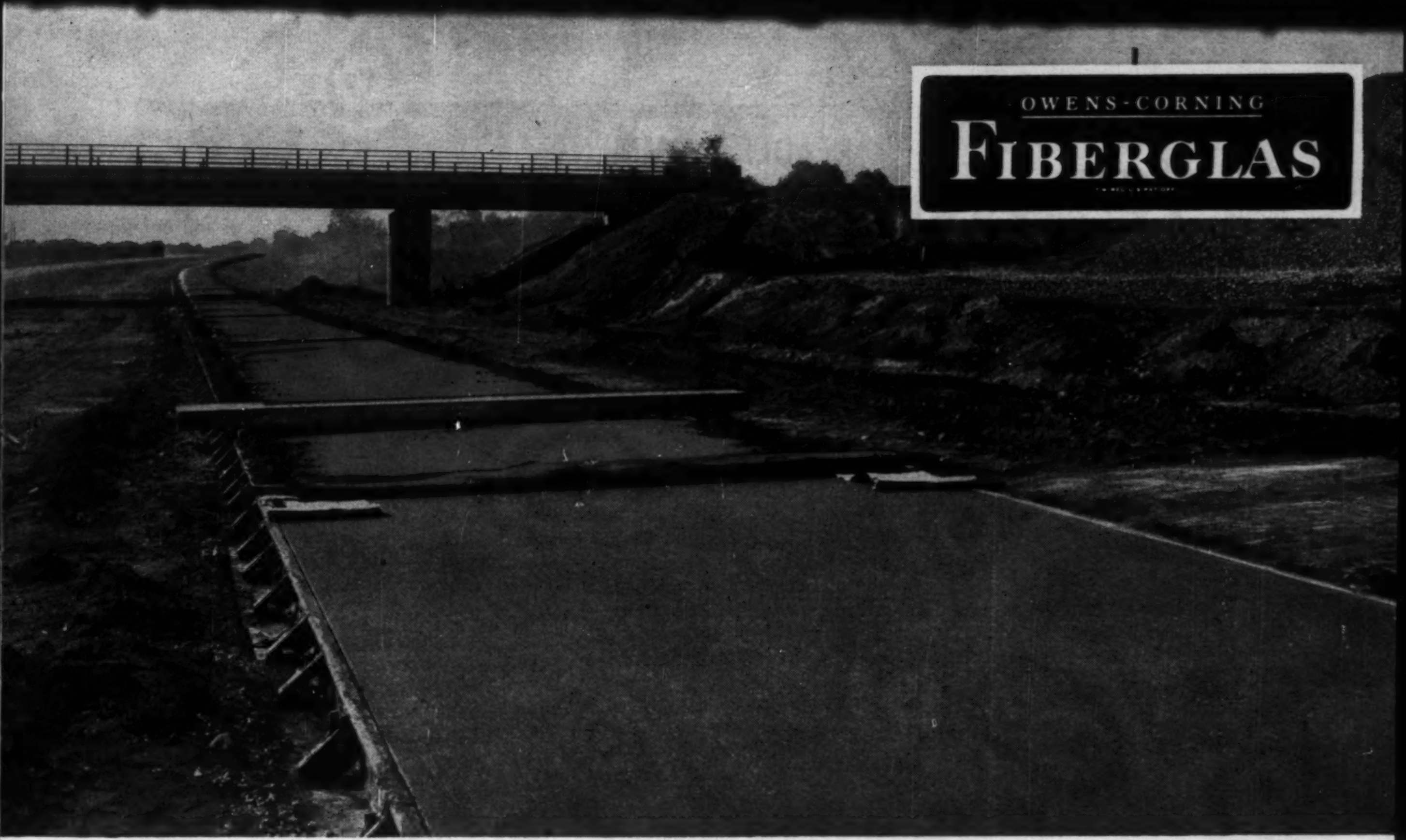

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Please mail more information on Butler steel buildings.

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READER COMMENT

Balanced Flood Control

Sir—Congratulations on your editorial "Can Flood Control Cope with Flash Floods?" in the September 1 issue. Such sane reasoning is needed to counteract the claims of doubtful veracity by advocates of both down-stream and up-stream flood control projects that if only their pet projects had been built the damage would have been greatly lessened.

You have correctly pointed out that the greatest protection from flood damage would come from increasing the channel capacity of the streams and by zoning to prevent building in areas known to be subject to dangerous flooding. Yet this will not be as popular as flood-storage reservoirs, large and small. Will the public be willing to pay the price of relocation of property values and sharing the costs with the federal government?

A storm such as the recent one could hit any section of the country. What is needed is a realignment of our national flood control policy with a better balance between storage structures, channel clearance, and flood-plain zoning; and a more equitable sharing of the costs between federal, state and local governments.

Richard W. Smith, *Manager*
Natural Resources Department
Chamber of Commerce of
the United States
Washington, D. C.

Standards for Soil Testing

Sir: Please permit me to comment briefly on your editorial in the July 14 issue, p. 120, concerning Professor Burmister's views on soil testing.

Deep foundation soils are the most variable and heterogeneous materials in the universe and in developing standards for testing; we, of Committee D-18 of the ASTM, thoroughly realize that we are not dealing with acceptance tests which apply to paints, metal alloys, concrete, etc.

Note that I choose the expression, "standards for testing," rather than "standard tests." There is a distinction, recognized by all, I believe, who have struggled with deep foundation soil problems. We recognize that there are basic principles of certain general features of soil testing that have general application in all techniques and procedures observed in soil laboratories; but beyond this, we are well aware of the fact that the procedures themselves must be flexible to the extent that they may be adapted to a wide range of soil conditions and types of structures.

The term, "soil conditions," is used advisedly and in contradistinction to the term, "soil properties." Such physical properties as grain size distribution and specific gravity are not altered by construction procedures or even by testing, but such structural properties as resistance to shear, rate and magnitude of consolidation, etc., change with the conditions imposed on the soil mass by construction procedures. In Navy water-front construction, we know that we can preserve or destroy desirable structural properties of soils according to choice of construction operations and the sequence of operations. Books can be written on this subject. For example, there are many different means for unwatering the site of such a particular graving dock, several wrong ways, and one or more ways that are right. The right way assures preservation and utilization of the in situ structural properties of the foundation soils to a maximum extent.

All soil testing for deep foundation work must be planned with two major objectives in mind: first, to obtain adequate and economical design; and second (and of equal importance), to work out or develop the construction procedures that can guarantee a minimum of foundation instability.

It is repeated that soil tests must be *planned* with these two objectives in mind. How then can there be a cut and tried routine procedure that has equal application to all manner of types of structures and to extremely varied soil conditions? One of the most fatal of all errors is to send soil samples from a site to a testing laboratory that has no knowledge of the site, of the terrain, of changing ground water conditions, of the type of structure to be built at the site, and of the complex problem of interaction of the soil and the structure, and ask that laboratory to make the "usual" standard tests of the soil samples, thereafter, turning the data over to some irresponsible optimist for "use."

The planning of the soil tests and the foundation engineering involved are inseparable. The standards for testing must be pliant and flexible to the extent that they provide means for solving the perplexing problems encountered in each individual case. It is true that there is a striking similarity in the problems encountered in many different cases; but there are also dissimilarities and, to this extent, soil

(*Continued on page 22*)

Flexible Plant Serves Two States

...designed and equipped by

TELSMITH

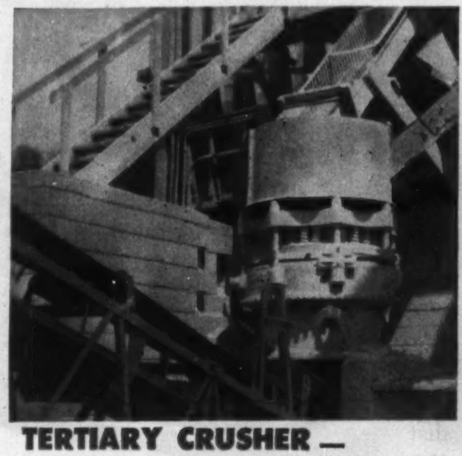
General view of plant with primary crusher house at extreme left.

D. M. Stoltzfus & Son, Inc., of Talmadge, Penn., own and operate three quarries. This is their Cedar Hills plant, at Peach Bottom, Penn., near the Maryland line. Designed and equipped by Telsmith engineers—this remarkably flexible plant produces sizes 1, 2, 6, 7, 8, 10 and 467 to meet Maryland specifications; and sizes 4, 3A, 2A, 2B, 2, 1B and 1 to meet Pennsylvania specifications. The plant easily turns out about 250 tons per hour. Find out about Telsmith Complete Plant Service. Ask for Bulletin 278.

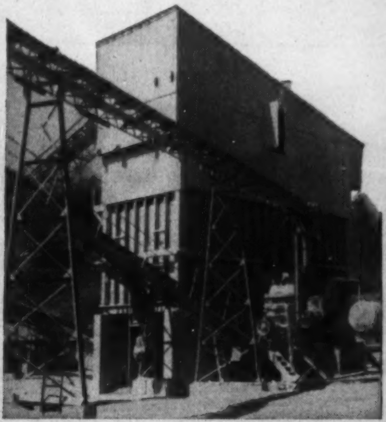
Q-31

PRIMARY CRUSHER—30″x42″ Telsmith Jaw Crusher, served by a 42″x14′ Telsmith Heavy-Duty Apron Feeder.

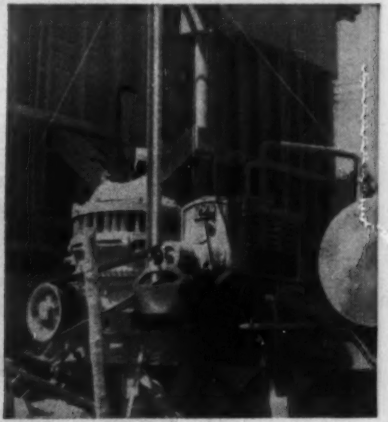
SCALPING SCREEN and SECONDARY CRUSHERS—(Left) Telsmith 13B Gyratory Breaker, and (right) Telsmith 10″x36″ Jaw Crusher preceded by a Telsmith 5′ x 12′ Double Deck Heavy-Duty Scalper.



TERTIARY CRUSHER—A Telsmith 36 Standard Gyrasphere.



INTERMEDIATE SCREENS—Telsmith 4′ x 12′, 5′ x 12′ Vibro-Kings.



FINAL CRUSHER—Telsmith 36 Fine Crushing Gyrasphere.

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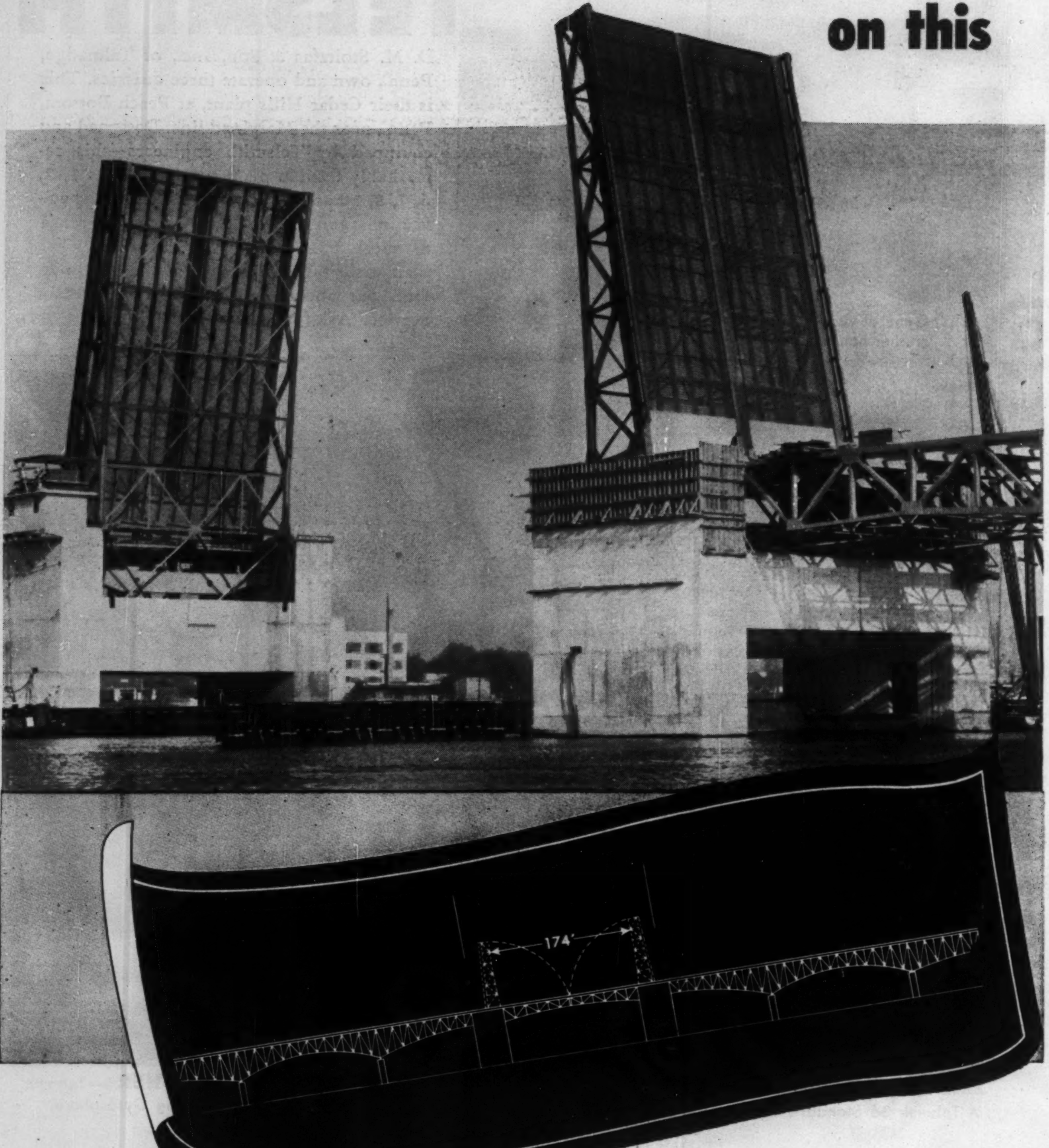
USS I-BEAM-LOK *saves* on this



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663,936 lbs. flooring deadweight

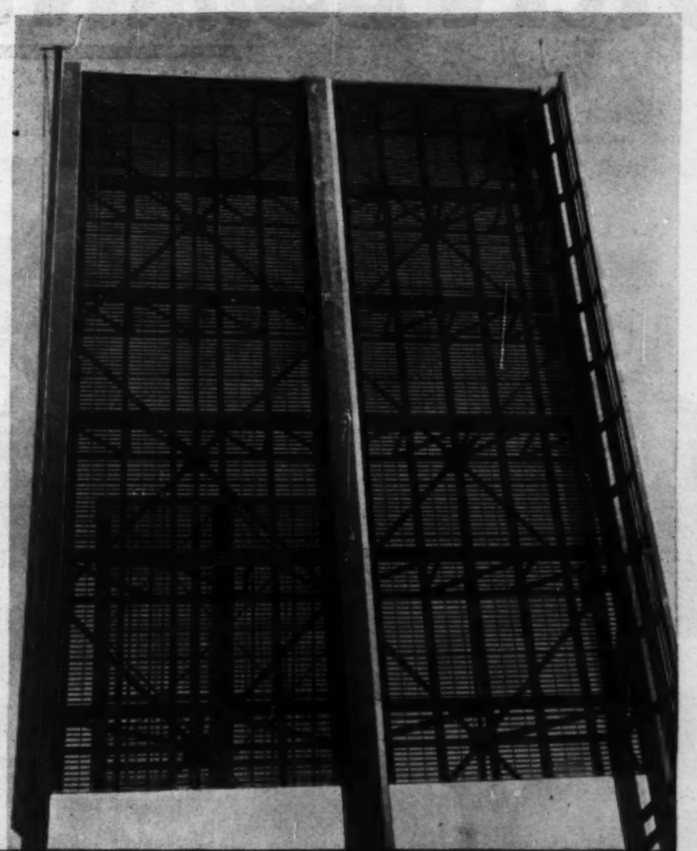
long, wide double-leaf bascule span

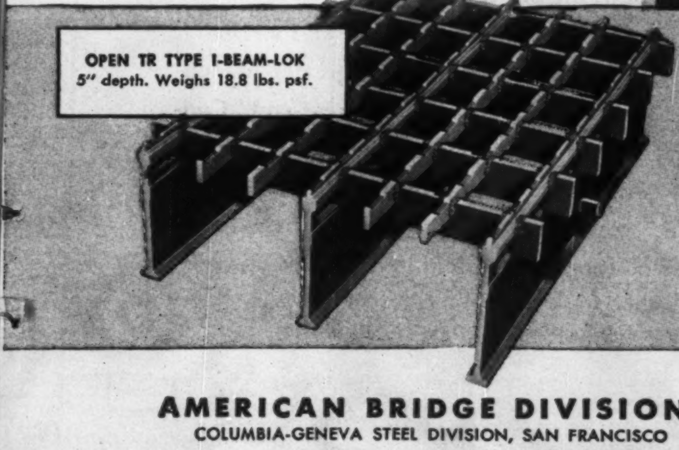
■ The 193'6" double-leaf bascule span on the four-lane Gilmore Street Bridge across the St. Johns River, at Jacksonville, Florida, provides another good example of the advantages of I-Beam-Lok lightweight steel flooring for structures of this type.

The total amount of USS I-Beam-Lok laid on the 55'11" roadway of the two bascule leaves is 10,677 sq. ft. of which 9,535 sq. ft. is the 5-inch open type flooring. The remaining 1,142 sq. ft. is the 3-inch concrete-filled type used in the part of the bascule leaves over the machinery.

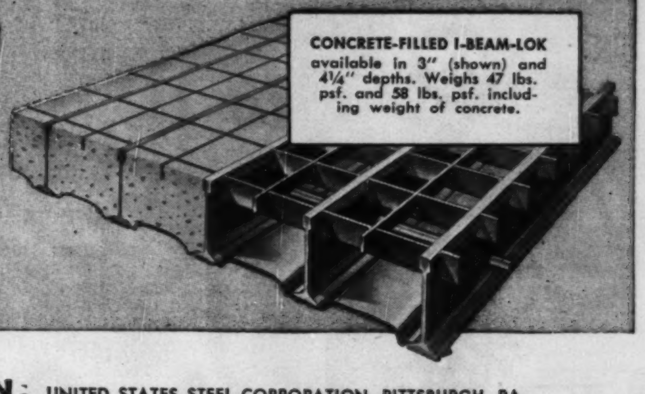
If conventional 7" concrete slab flooring (weighing 84 lbs. psf. as against 18.8 lbs. psf. for 5" open I-Beam-Lok and 47 lbs. psf. for 3" concrete filled I-Beam-Lok) had been used on this project, the floor of the long, wide double-leaf span would have had a deadweight of 896,868 pounds. *Four times greater than its present light 232,932 lbs. deadweight!* In addition, the heavier flooring would have increased the wind resistance of the span, and made necessary the installation of costlier, more powerful mechanical equipment to raise and lower the heavier bascule leaves of the span.

USS I-Beam-Lok is the modern floor for modern traffic. It combines lightweight and ensuing reduced costs with roadway rigidity, ease of erection, a smooth, hard surface and low maintenance costs. It is available in both open and concrete-filled types. Our engineers will be glad to discuss its possibilities with you. Just contact the sales office nearest you.





OPEN TR TYPE I-BEAM-LOK
5" depth. Weighs 18.8 lbs. psf.



CONCRETE-FILLED I-BEAM-LOK
available in 3" (shown) and 4¼" depths. Weighs 47 lbs. psf. and 58 lbs. psf. including weight of concrete.

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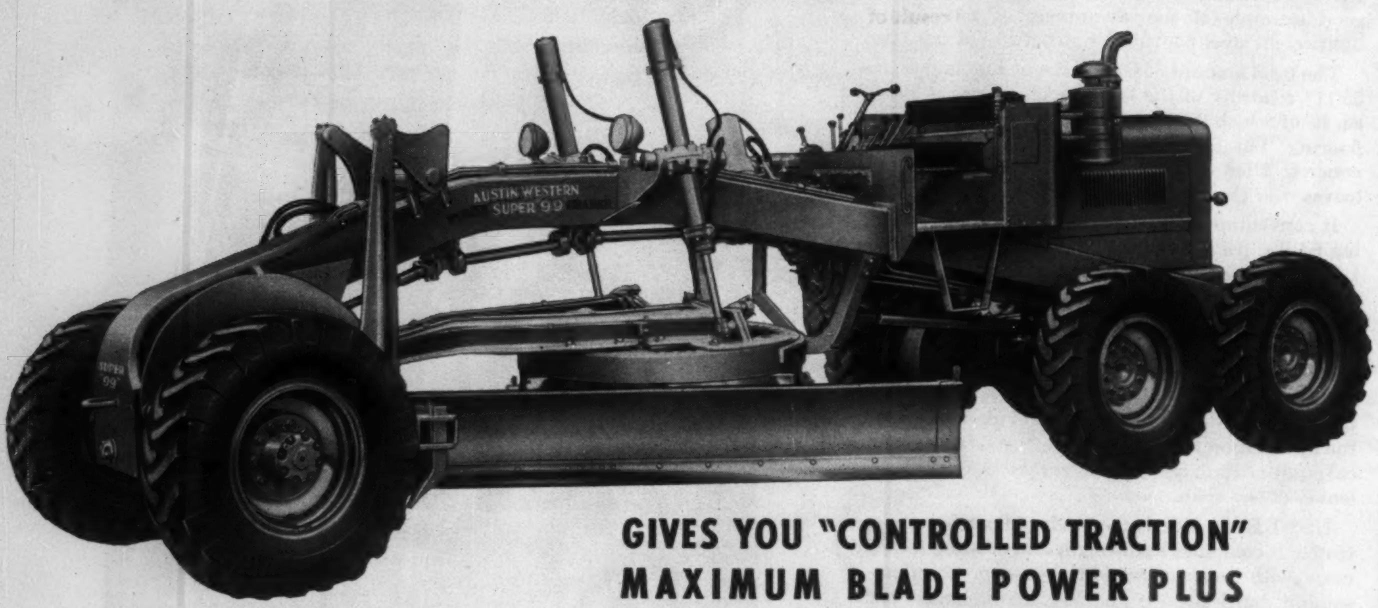

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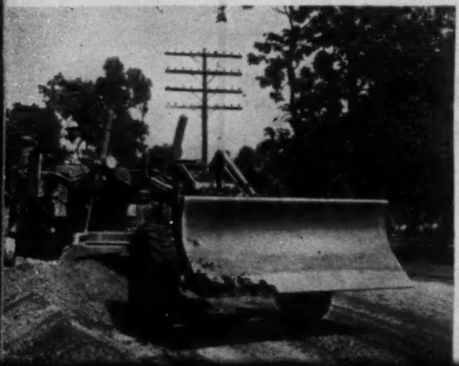
Whatever the job . . . whatever the ground conditions . . . your best buy in its class is the complete Power Grader, the new, big Super "99." With exclusive All-Wheel Drive for 30% greater Power-at-the-Blade; exclusive All-Wheel Steer for 100% greater Maneuverability, and exclusive "swing that rear-end" Controlled Traction for moving more material, farther and faster, the new Super "99" Power Grader with its six driving and steering wheels will outperform ordinary front steer motor graders, definitely and completely.



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ON ALL 6 WHEELS

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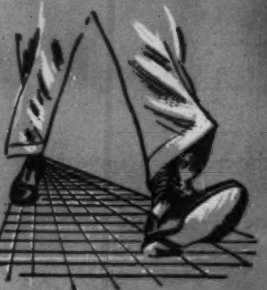

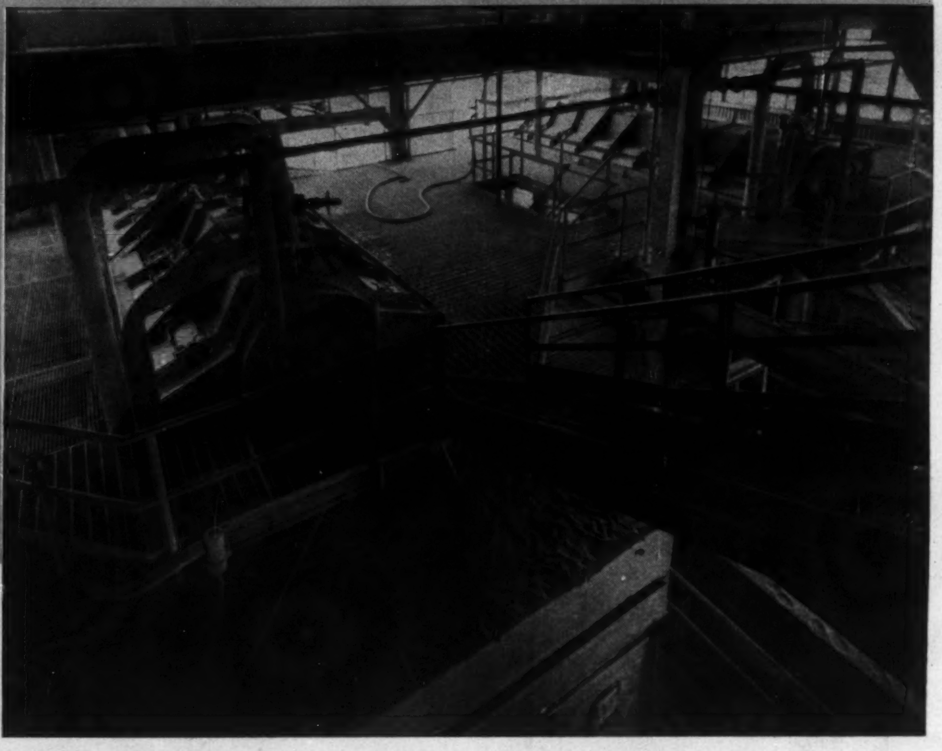

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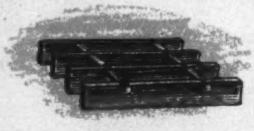

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ENGINEERS: Whitman, Requardt & Associates, Baltimore, Maryland, for Washington Suburban Sanitary Commission, Hyattsville, Maryland.

CONTRACTOR: Intercounty Construction Corporation, Hyattsville, Maryland.

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In more and more sewerage and drainage jobs where concrete pipe is required, UNITED STATES Concrete Pipe is being supplied with TYLOX Rubber Gaskets. Typical of this trend is the project shown above. Rubber Gaskets were specified because it is known from experience how they help to cut cost, lengthen life and reduce maintenance of concrete sewers and drains.

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LOW COST of installation, and in future operation and maintenance of the line.

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ENR-5511

READER COMMENT

testing procedures used in the different cases must be correspondingly dissimilar, modified and adapted for each separate project.

It is extremely difficult to put into words the experience of many years that warns us against the use of misinformation provided by inflexible, routine standard soil testing procedures. The more varied is one's experience, the more he appreciates this fact. In a few phases of soil engineering such as the compaction of subgrades prior to the paving, it is possible to have standard tests that tend to be inflexible. There is some possibility for having such standards in dealing with surface soils; but those whose experience is confined to this rather narrow field require a better appreciation of the difficulties encountered in foundation problems if they consider that standard tests can be described which require no modification in dealing with the problems of the other fellow.

L. A. Palmer
Engineering Consultant
Soil Mechanics & Paving
Bureau of Yards and Docks
Department of Navy

Psf not Psi

Sir—Although we maintain due respect for hurricane winds in this area, our present building code wind loadings are based on only 45 pounds per square foot instead of the 45 pounds per square inch referred to in your editorial, "Can Hurricane Damage Be Cut" (ENR Aug. 25, 1955, p. 96).

Seriously, though, your editorial has been read with appreciation by engineers in this area; additional studies of hurricane damage and what engineers can do to reduce damage will be welcomed in Miami.

Herbert S. Saffir
Assistant County Engineer,
Dade County, Miami, Fla.

[Editor's Note—Sincere apologies for a typographical error (psi for psf) thrice repeated.]

Timber in Schools

Sir—Your report on Schools in the May 26 issue gave an excellent picture of the problem confronting our country and of some of the steps being taken to alleviate the situation. One important phase of the subject, however, did not in my opinion receive sufficient recognition:—that is, the strong assist given to economical school construction by the use of en-

(*Continued on page 30*)

Check 'Em!

ONLY ADAMS Motor Graders have all these time and money-saving advantages

8 Forward Speeds

✓ Provide the "right" speed for every operation and a higher travel speed. Save time—reduce costs.

4 Reverse Speeds

✓ Up to 13 mph. . . . Save valuable production time backing on short stretches, between forms, etc.

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✓ ¼ to 1¾ mph. (optional). Use full engine power while gearing grader to slow-speed operation.

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✓ Floating power—no engine vibration transmitted to grader. Increases operator efficiency.

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✓ *Easy, positive gear shifts at all speeds . . . Heavy construction with helical gears on roller bearings for quietness and long life. The finest ever put into a motor grader.*

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- concaves
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- bulldozer blades
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- truck beds
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- ore car wheels and liners
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Amsco also produces other alloy steels with maximum wear resistance under particular conditions of service.

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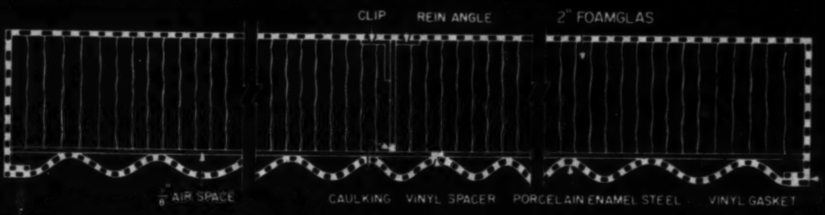
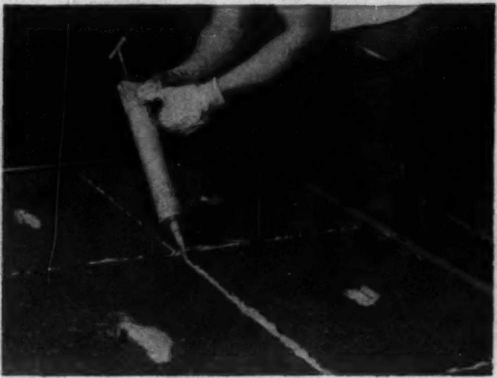


Architect: Vincent G. Kling, A. I. A., Philadelphia, Pa. • *Consultant:* I. M. Pei, New York, N. Y. *General Contractor:* Turner Construction Co., New York, N. Y. • *Panel Manufacturer:* Ingram-Richardson Mfg. Co., Beaver Falls, Pa. • *Roofer:* Wm. C. Kulzer Co., Philadelphia, Pa.

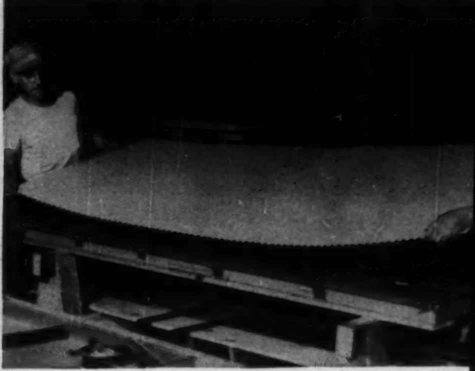
Unique porcelain enamel-cellular glass sandwich developed for RCA's Cherry Hill curtain walls

The architect, members of his staff and RCA's representative check progress at the job site during erection of the five Cherry Hill buildings. The owner and the architect report: "We overcame design problems plaguing grid-panel pioneers by insulating the porcelain enamel panels with 2" FOAMGLAS.

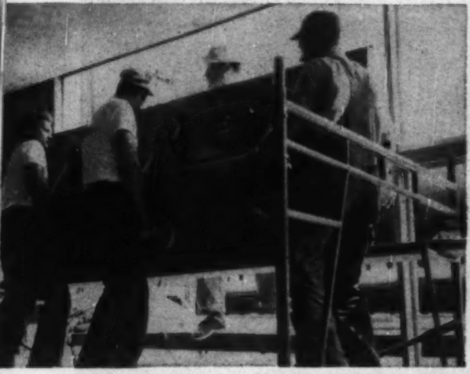
"We avoided any moisture problem by providing a ⅛" air space between the insulation and the outer porcelain enamel skin (detail above).



"Moisture can accumulate only in the air space and runs down moisture-proof FOAMGLAS to a weep strip. Caulking seals joints.



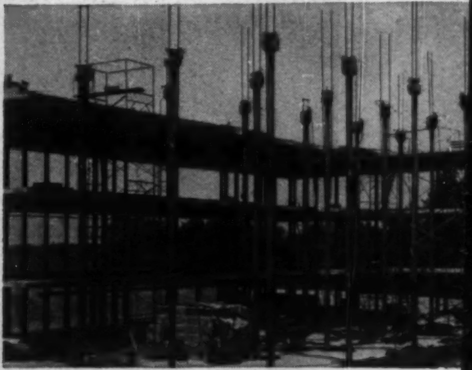
"High rigidity of FOAMGLAS and vertical corrugations of outer skin prevent 'oil-canning' or dimpling.



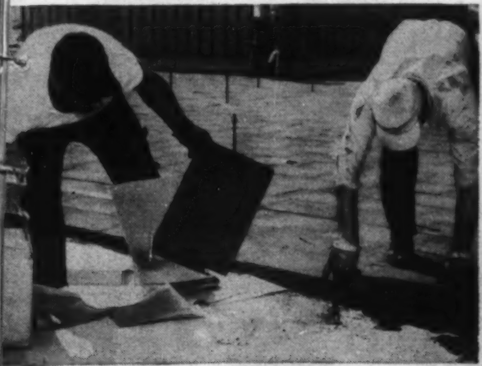
"Completed 94" x 34" PORCELPANELS* weighing just 6½ lbs. per sq. ft. were easily lifted into place.

* ® Ingram-Richardson Mfg. Co.

"Our unique panels combine ultra-modern appearance and high insulating efficiency (U factor 0.15)... cost just $4.50 per sq. ft. erected in place.



"Lift slab method cut construction time and costs. Roofing materials were raised right on the top slab.



"We also insulated most roofs with FOAMGLAS. Its high strength permits heavy foot traffic, minimizing need for catwalks.

"FOAMGLAS gives our Cherry Hill buildings added protection, too, because it's fireproof."

Use coupon today for a copy of our brand new booklet on latest curtain wall designs which utilize . . .

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☐ Please send me the brand new booklet on FOAMGLAS insulation for prefabricated curtain wall panels and other dry wall construction.

☐ Send engineer to discuss a special insulating problem.

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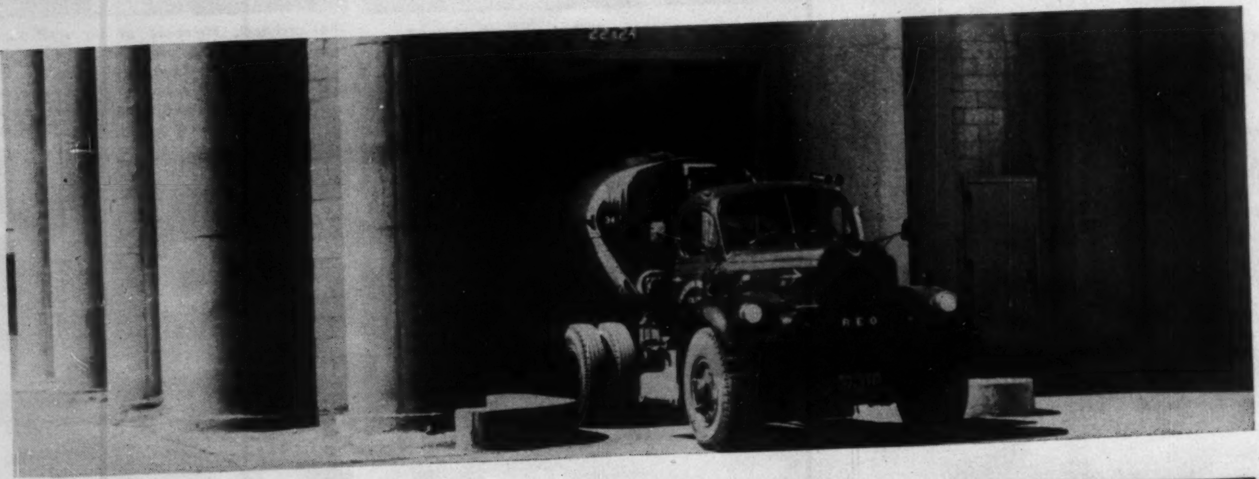
Look at Reo, like

These Buffalo Bulk Cement Haulers looked and bought—



REO
CARLSON
TRUCK
SERV

TRUCKING
REO

they did in Buffalo

here's what they say:

Left to right: Gene Schwartz, Oscar Wohlhueter, August Deuchlar, owners of Concrete Delivery Co., Inc., Lackawanna, New York. Oscar Wohlhueter, President, states—"These Reo Model A-603s powered by your V-8 220 H.P. engine are the finest we have ever owned . . . remarkable performance and economy. Our drivers report the V-8 goes up grades in 1 to 1½ higher gears than any they have driven."

E. F. Carlson, President, Carlson Truck Service, Inc., Buffalo, says—"Ours is one of the toughest kinds of trucking there is, stop and go, short hauls with heavy loads up to 40,000 pounds.

We have been using Reos since 1952 and our first units have acquired over 100,000 miles without a major overhaul. Our records show conclusively that Reo Tractors are a major factor in holding down our cost per mile."

Robert C. Schutt, President, John Schutt, Jr., Inc., Buffalo, reports—"We are very pleased with the performance of our Model A703 Reo powered by your 220 H.P. V-8. Average fuel mileage is 5.25 M.P.G.

Anthony Palmer is one of our drivers. He says he is amazed at the driver comfort, the maneuverability and the power-plus that this Reo has."

and your next truck will be REO, too!

REO has the most complete advanced line of heavy- and medium-duty truck engines available today—*with both short stroke design and revolutionary wet-sleeve construction.* Choice of V-8s or sixes, gas or LPG. Pound for pound Reo Gold Comet V-8s are the *most powerful heavy-duty truck engines ever built,* actually delivering a startling ½ h.p. per cu. in. displacement—as much as 35% *above the industry average.*

REO features the conventional type "full comfort" cab in its entire V-8 line. Only 96" (front-of-bumper-to-back-of-cab), it permits hauling of 35' square nose trailer within 45' overall.

REO designs its own engines and backs every one it builds with a *100,000 Mile or 1 Year Warranty,* whether in new Reo Trucks or for replacement in other makes. No other manufacturer gives you such positive assurance of outstanding performance.

REO knocks out high overhaul costs and downtime loss with built-in engine features, like wet-sleeve construction, that permit complete overhaul in as few as *15 hours.* Complete overhaul kits cost as little as *$169.47* (list).

REO builds trucks that are "commodity engineered" *at the factory* to meet your specific needs, thereby assuring you of lowest possible cost of operation . . . *trucks built for truckers by truck specialists.*

LOOK AT REO! Ride in one—drive one—an amazing "new concept" in live-wire, big truck performance awaits your discovery. Look under "R" in your telephone book and call your Reo branch or distributor today.

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SUBSIDIARY OF BOHN ALUMINUM AND BRASS CORPORATION

TRUCKS, BUSES AND GOLD COMET ENGINES FOR ORIGINAL EQUIPMENT, INDUSTRIAL AND REPLACEMENT—GAS OR LPG.

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WORLD'S TOUGHEST TRUCK

Uranium Strike!

Back in the hills of the Colorado Plateau, the dependability and low-cost operation of Le Roi Compressors pay off

Uranium is a magic name. And to anyone interested in low-cost, dependable, air compressor operation, the name of Le Roi is magic, too. Just take a look at a few features that keep Le Roi Compressors running after others have "called it quits":

- Suction and discharge valves are interchangeable.
- Cylinders have circumferential fins for better cooling — greater efficiency.
- Radiators and intercoolers have sectional cores.
- Larger air receiver reduces pulsation and cools the air so that tools run better.
- Larger engines for greater reserve power permit slower operating speeds, longer life.

Le Roi Compressors are available in sizes from 85 cfm to 600 cfm. Gas or diesel models and a complete selection of mountings. Bulletins give full details — write for your copy.

C-157

LE ROI *Division of Westinghouse Air Brake Co.*
Milwaukee 14, Wisconsin

PORTABLE AIR COMPRESSORS — TRACTAIR — STATIONARY AIR COMPRESSORS — AIR TOOLS — ENGINES

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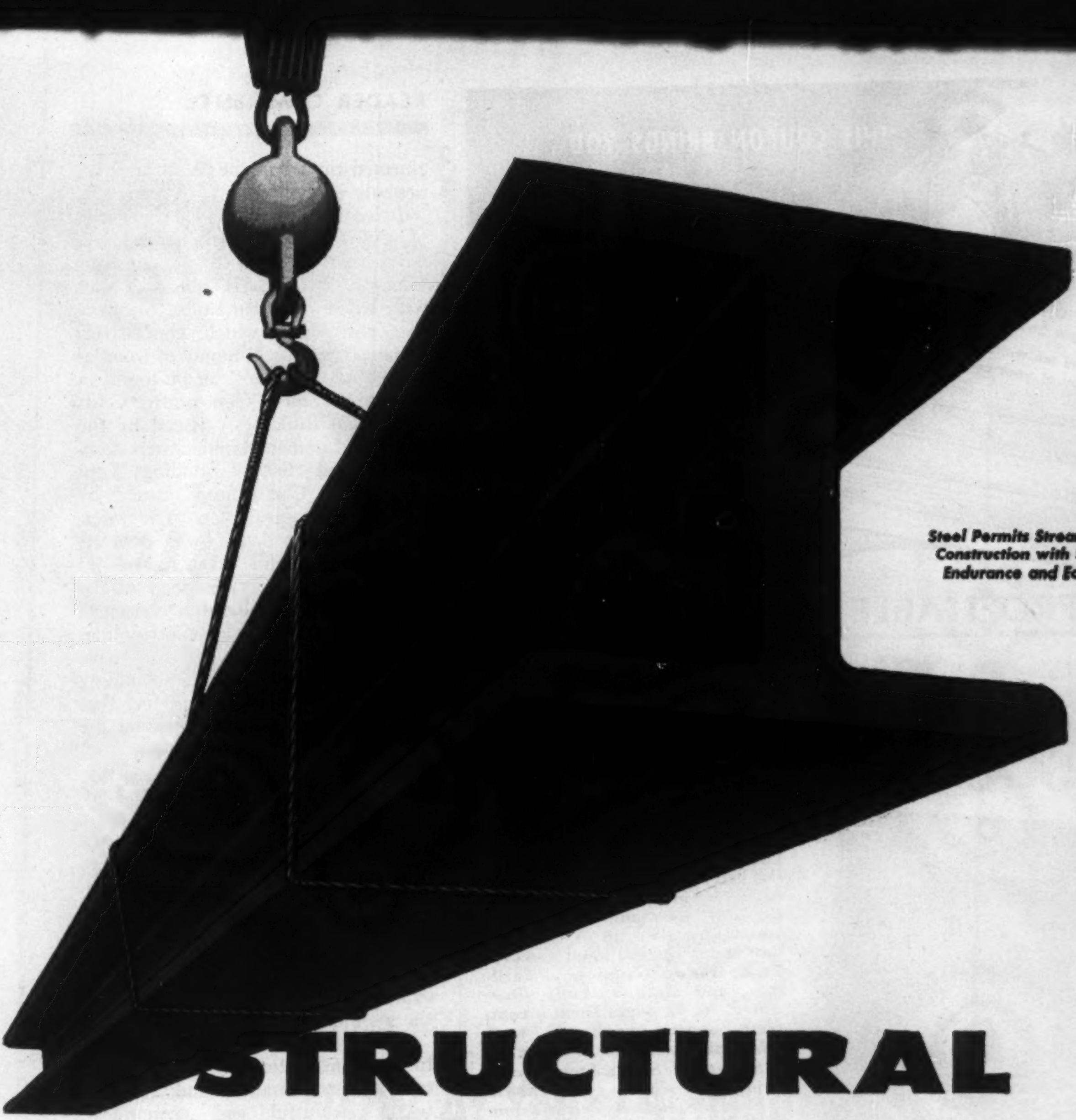
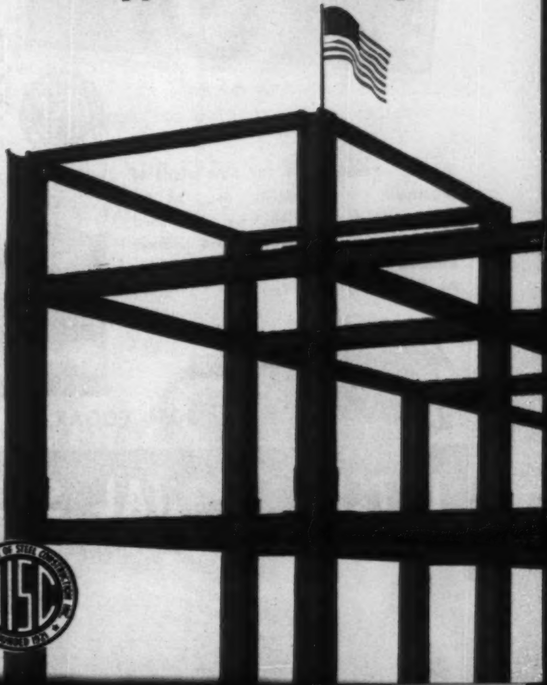


Steel Permits Streamlining Construction with Safety, Endurance and Economy

STRUCTURAL

STEEL for bridges and all types of buildings



No other construction offers these time-proved advantages:

- Speed of construction
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Send me without cost or obligation my personal copy of your new "Steel Facilities Service Manual".
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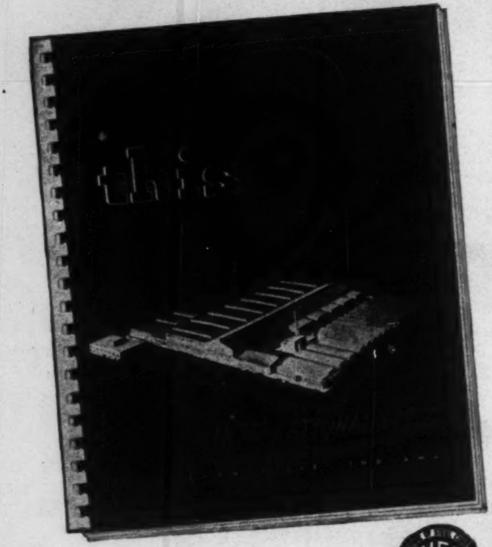


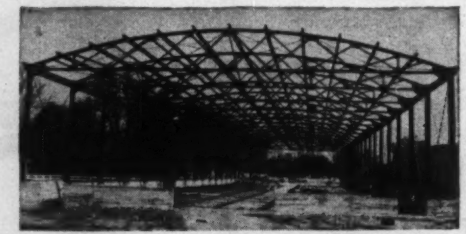
HERE is a book that belongs in the reference file of *every buyer* of *every kind* of fabricated steel. Between its handsome covers, you'll find a wealth of information about International Steel — its operating philosophy, facilities, and abilities. Fully illustrated, its 42 pages form a complete source book of steel fabrication services covering:

Structural Steel; Steel Building Products; Warehouse Steel; Standard and Custom Steel Buildings; Farm Buildings; Aviation Buildings; Hangar Doors; Industrial Doors; Railroad Car Component Parts; Stainless Steel Products; Revolving and Swing Door Entrances.

Here, in fact, is an invaluable buying guide — not just another "company history" — that the above coupon brings you. Please mail it *now*, as supply is limited.

AISC

Structural framework for new plant of Marshall Planing Mills, Inc., at St. Matthews (Louisville), Ky. Standard Bowstring Installation and Steel Beaded Sheet Roof by INTERNATIONAL STEEL COMPANY.



INTERNATIONAL SERVICE

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INTERNATIONAL STEEL COMPANY

gineered timber in the West and particularly in California.

It is safe to say that a large majority of recent California school buildings have been of wood frame construction, or of Type III—masonry walls with wood roof structure. Comparative cost data, which conclusively demonstrates the economy of wood as a structural material, can be found in two publications: "Comparative Costs for School Buildings," issued by the National Lumber Manufacturers Association; and "School Buildings Your Tax Dollar Can Afford" issued by Timber Engineering Co. The information contained in these booklets shows the way for other sections of the country to take advantage of the economies offered by well conceived and well designed timber construction.

We have been privileged to have participated in the school building program in the West and feel that we, along with other members of the American Institute of Timber Construction, have done much to insure the economical construction of hundreds of classrooms, multi-purpose rooms, gymnasiums, etc. The success of this program is very largely due to the important part played by glulam beams and arches. Through their unique ability to provide architectural beauty, along with excellent structural properties, they permit the use of exposed structural elements without the sacrifice of architectural effect.

Experience has shown engineered timber construction to be highly fire resistant, structurally sound, architecturally beautiful and economical. Many more schools could be built annually with the available dollars if school boards would insist on buildings incorporating engineered timber construction in their design.

MacGregor Graham
Sales Manager,
Timber Structures, Inc. of Calif.
Richmond, Calif.

A Tribute

Sir—Engineers as a class seldom pay public tribute to their colleagues during the short span they spend on this earth. True recognition of a man's greatness does not come forth usually until after his death.

I am reminded of this by reading in the pages of ENR, June 16, 1955, of David B. Steinman's gift of a scholarship to The Newark College of Engineering.

While foreign governments have conferred honors upon Dr. Steinman, it appears as a slight that his own

(*Continued on page 42*)

an
ACCO
product

American Cable
TRU-LAY VHS
15%
STRONGER

NOW At Your Distributor
The New Wire Rope That's Breaking All Records

For Shovel Hoist Ropes, Scraper Ropes and Draglines
Your American Cable Distributor now has Draglines, Shovel Hoist Ropes and Scraper Ropes made of New TRU-LAY VHS. This new wire rope was specially developed for these toughest applications in the construction field. It is 15% stronger than Improved Plow Steel, which was the strongest grade available until now.

Heavier Loads—Higher Safety Factor
With New TRU-LAY VHS you will be able to handle heavier loads with the same diameter line. And its greater strength means a higher factor of safety during its entire service life.

Tougher . . . For Longer Life
In addition to its greater strength, new TRU-LAY VHS is also tougher . . . more wear resistant. And it has all of the advantages of preformed construction. This means longer life under the rough treatment that Scraper Ropes, Shovel Hoist Ropes and Drag Lines necessarily get.

Less "Down Time"—Cuts Costs
Because it is tougher and more wear resistant, TRU-LAY VHS rope lasts longer, costs less to use and cuts "down time" of equipment for wire rope replacement.

TRU-LAY VHS ropes are easy to order. Just ask for TRU-LAY VHS Shovel Hoist Ropes, Scraper Ropes or Draglines, in the size you want. You don't need any complicated specifications.

Your American Cable Distributor has TRU-LAY VHS in stock now. See him or write to the nearest American Chain & Cable Company office.

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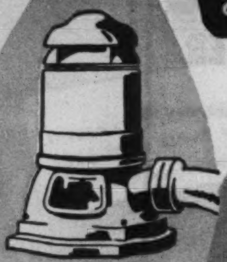
ask the man from Layne

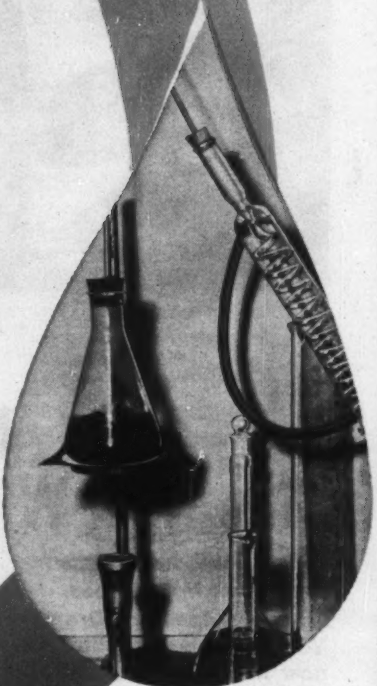


. . . he offers complete service . . . and undivided responsibility!

There can be no "buck passing" on any job Layne undertakes for Layne assumes complete and undivided responsibility for every phase of every job.

City officials—farmers—and captains of industry know that when it comes to water, it is smart to put all your eggs in one basket.

On any question that relates to water, first "ask the man from Layne." He is the water answer man and his services are free upon request.



LAYNE & BOWLER, INC.
General Offices
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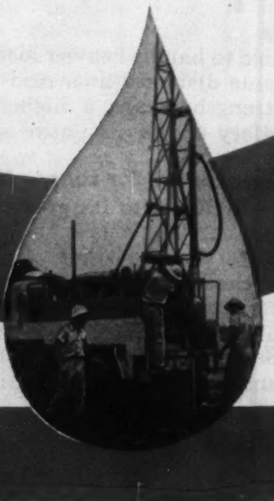

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Companies
Throughout the World

water wells • vertical turbine pumps • water treatment

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6x19
6x37
8x19
6x7

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One of the best ways to find out "what goes" is to be right on the spot. That's why a Wickwire distributor is a wire rope expert—he practically lives with the industries he supplies with wire rope. He knows his customers' specialized problems from first-hand experience, and is able to give competent practical advice on the best construction—6x19, 6x37, 8x19, etc.—for them to use. And he delivers the type, size and length of wire rope they need directly from his warehouse stocks. They save time . . . storage space . . . paper work.

Your Wickwire Rope distributor is a good man to know. He's quality people handling quality products. Buy your wire rope and wire rope slings from him. You'll find that the many valuable services he offers far outweigh any apparent price advantage you might gain by buying direct.

CF&I

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A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

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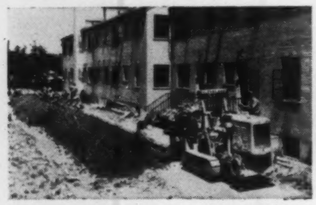
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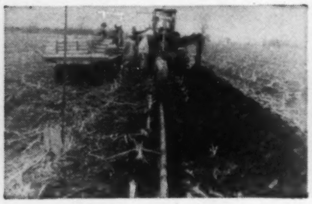
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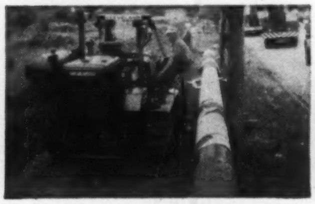
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PIPELINE BACKFILLING

THE CLEVELAND TRENCHER CO. • 20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

CLEVELAND

LARGE SIZE AIRTHERM ROOF DECK REDUCES COST 10%

TWO PANELS COVER 100 SQ. FT.

- fewer laps
- more rigid construction
- greater fire resistance

ARE YOUR JOBS GETTING THE LOWER COST BENEFITS OF AIRTHERM ROOF DECKING?

No construction delay because of weather—that's the reason steel decking saves invaluable time and money. Airtherm large size Decking reduces labor and handling costs as much as 10% by actual installation reports. This results in additional time savings, quicker occupancy, fewer laps, greater structural strength, and a more fire and buckle resistant roof. Make us prove Airtherm's advantages on your next roof deck job. Phone, wire, or mail coupon.

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Gentlemen:
Please send complete information on Airtherm Roof Decking.

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photo courtesy Merritt-Chapman & Scott

HOW CONTRACTORS BEAT TIGHT SCHEDULES

SAVE TIME, LABOR, MATERIALS WITH MOTOROLA 2-WAY RADIO

With construction work usually sprawled out over a large area and working sites changing frequently, Motorola 2-way radio ties the whole operation together with the most versatile, quickest communications possible . . . gets the job done faster and at less cost.

With radio, key personnel, foremen and superintendents have constant contact with every part of the project. They can answer questions or get their questions answered and give orders without spending non-productive travel time or leaving their posts where they're needed most.

Problems that would take hours to solve are taken care of in minutes using 2-way radio. Equipment needed on a temporary basis is directed to various assignments by radio without wasting any motion or returning "home" first. When breakdowns leave valuable men and machines idle, radio dispatches help immediately, gets them back to work faster. Concrete placing crews can radio changes in requirements to the batch plant immediately and accidents gets fast attention.

Get the facts. Find out how Motorola 2-way radio will pay for itself in a remarkably short time and then add clear profits for you for years to come. To get *all* the advantages radio offers, *insist* on Motorola, serviced by the Motorola man right in your area. Write today for his *experienced* help in planning your radio system.

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2-WAY RADIO

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Motorola consistently supplies more mobile and portable radio than all others combined.
Proof of acceptance, experience and quality.
The only COMPLETE radio communications service — specialized engineering . . . product . . . customer service . . . parts . . . installation . . . maintenance . . . finance . . . lease
"The best costs you less — specify Motorola."

5 years of job-proved savings in portable air-power costs

600 cfm GYRO-FLO portable compressor serving two Wagon Drills on a highway improvement project.

600 CFM

GYRO-FLO rotary compressors

Five years ago, Ingersoll-Rand pioneered a new revolutionary portable compressor with no pistons, rings, rods or valves—the 600 cfm GYRO-FLO. Its advantages over the reciprocating compressor were so great that it looked almost too good to be true. Hence there was much speculation as to how it would stand up under actual on-the-job conditions.

Today, there can be no room for doubt. The 600 cfm GYRO-FLO has won its service stripes in the world's toughest proving ground—the heavy construction field. Five years of performance on all kinds of jobs have proved its outstanding economy, dependability and remarkable freedom from maintenance. Smaller—lighter—smoother running—air temperatures under 200°F—low oil consumption—closer regulation at all loads from 0 to 100% capacity. These advantages are a matter of record.

Available in 125, 210, 315 and 600 cfm sizes, the GYRO-FLO, with five years of time proven experience, stands out as the finest portable air power plant obtainable. Ask your I-R representative for the complete, cost-saving details.

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CONTRACTORS' COMBINATION

COMPRESSORS • ROCK DRILLS • AIR TOOLS • CARSET JACKBITS • PUMPS

2

TWO FOR THE ROAD

Watch a new highway under construction and chances are that Berger Instruments—like these latest model transits—are marking them out precisely—the 6¼″ transit for the most exacting requirements; Polara for the less complex. Just as so many Bergers have been doing for over 84 years everywhere in the world—on roads, large and small buildings, bridges and every type of construction project.

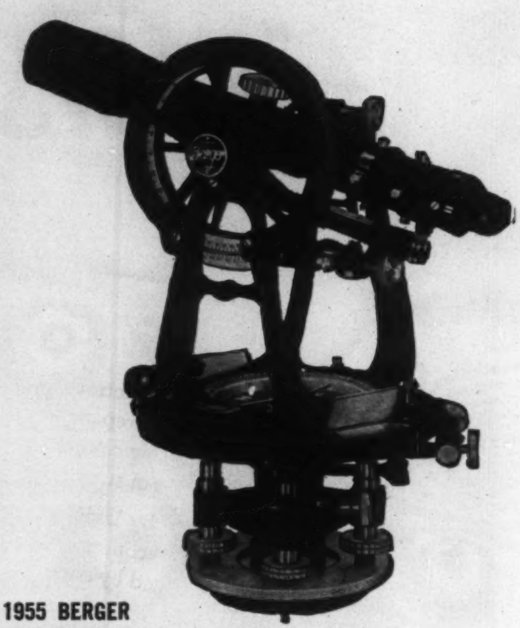
If you've never owned a Berger, you owe it to yourself to learn how accurate it really is... how little repair it requires... the lifetime of trouble-free service you can count on... how inexpensive a Berger Instrument is in the long run.

Put yourself behind a Berger—so many road builders do. Write for "Accuracy in Action". C. L. BERGER & SONS, INC.
45 WILLIAMS ST., BOSTON 19, MASS.

THE BEST IN SIGHT IS

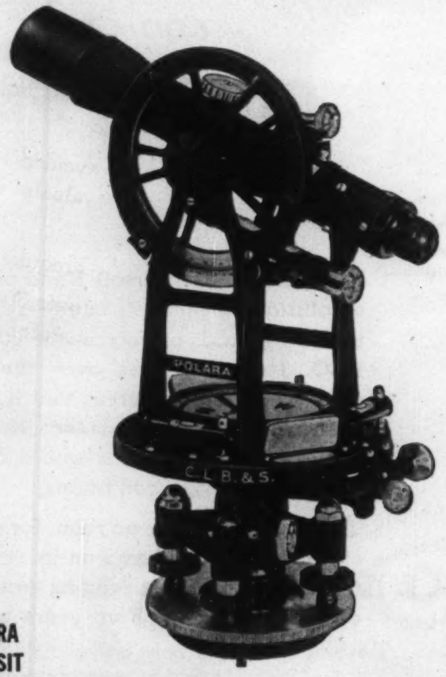
BERGER

ENGINEERING AND SURVEYING INSTRUMENTS... SINCE 1871



**1955 BERGER
BRONZE TRANSIT**

Supreme achievement of 84 years of instrument making. Newly designed optical system, 6¼″ transit has 26 power telescope, coated optics, resolving power 3½ sec., effective aperture 1.430 inches (36mm), field of view 1 deg. 6 min. Fully enclosed nickel silver leveling screws, replaceable bronze bushings, 3¾ ft. short focus. Reversion vial included. Mahogany transit case and white ash tripod at no extra cost.



**POLARA
TRANSIT**

Exceeds government specifications for 5½″ transits—fills need for accurate low cost standard engineers' transit reading to one minute. Brass and bronze construction, light weight. 5½″ horizontal circle; 5″ vertical circle. Newly designed optical system for precise stadia readings at greater distances. 22 power telescope with resolving power of 4 sec. Short focus 3 ft. Fully enclosed nickel silver leveling screws. Mahogany transit case, white ash tripod at no extra cost.

IRVING GRATINGS UNEXCELLED From Every Angle!

Engineering-Wise:

1. Irving *specializes* in the manufacture of *all types* of gratings. Irving engineers are prepared to handle any grating problem, no matter how complicated (such as proper fit, unusual conditions of stress, corrosion, etc.).
2. Complete pre-order service by Irving estimating staff includes prompt, accurate recommendations and quotations. All orders are checked by engineers with years of specialized experience.
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4. Prior to shipment gratings are carefully inspected for conformity to specifications and to Irving high standards of quality.

Economy-Wise:

- Precisely fabricated panels make installation easier, faster.
- Costly mistakes are avoided by utilizing up-to-date engineering skill and valuable experience unique with Irving.
- Irving quality gratings require minimum maintenance.
- Irving reputation of over 50 years of customer satisfaction is your guarantee of effective grating application.

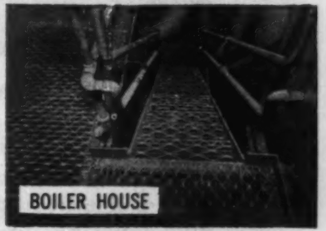
Performance-Wise:

OIL REFINERY

Non-skid; fireproof

BUS LAUNDRY

Strong; self-draining


BOILER HOUSE

Self-ventilating; durable

SEWAGE PLANT

Irving ALUMINUM Gratings—rustproof, sparkproof, lightweight

PIONEERS of the OPEN METAL FLOORING INDUSTRY

ESTABLISHED 1902

IRVING SUBWAY GRATING CO., INC.

Plants:
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Write today for our illustrated catalog containing engineering data on Irving Riveted, Welded and Presslocked gratings that will save you time and money!

NEW JERSEY

PENNSYLVANIA

PETER KIEWIT SONS CO.

MUELLER®

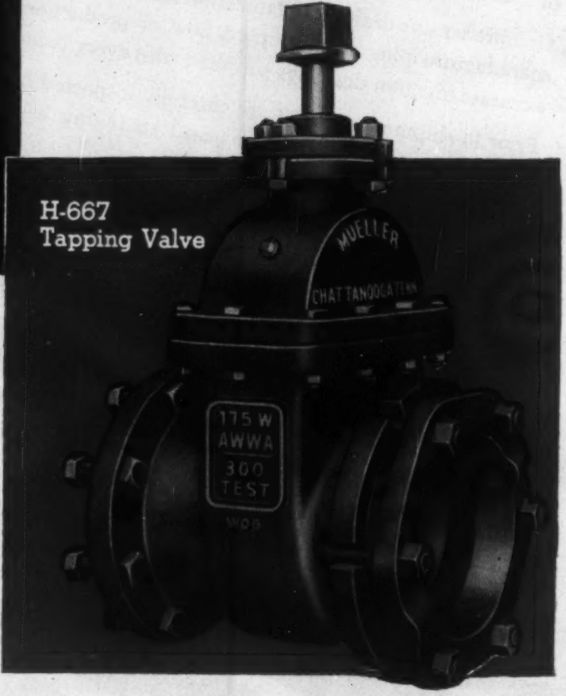
Connect Branch Mains...

quickly
safely
simply

under pressure!

MUELLER
MUELLER

H-615
Tapping Sleeve



H-667
Tapping Valve

Mueller Tapping Sleeves and Valves are the most practical—and economical—means of connecting lateral or branch mains. Connections are made and lateral is put in service under pressure with a Mueller "CC" or "C-1" Drilling Machine—no shutdown, no loss of water, no interruption of flow in main!

Heavy duty construction and extra length of mechanical joint tapping sleeve assures maximum rigidity and strength. One mechanical joint sleeve of a nominal size will fit all classes of cast iron pipe regularly used by using only two sets of gaskets. Main sizes from 4″ through 12″ with various combinations of outlet sizes 2″ through 12″ are available.

Special mechanical joint tapping valve has oversize waterway—allows full-size cut for maximum flow. Exclusive four-point disc wedging mechanism assures tight shutoff and trouble-free operation. Available with "O" rings or conventional packing in sizes 2″ through 12″.

Tapping Crosses, Split Repair Sleeves and Cut In Sleeves and Valves are also available with mechanical joints.

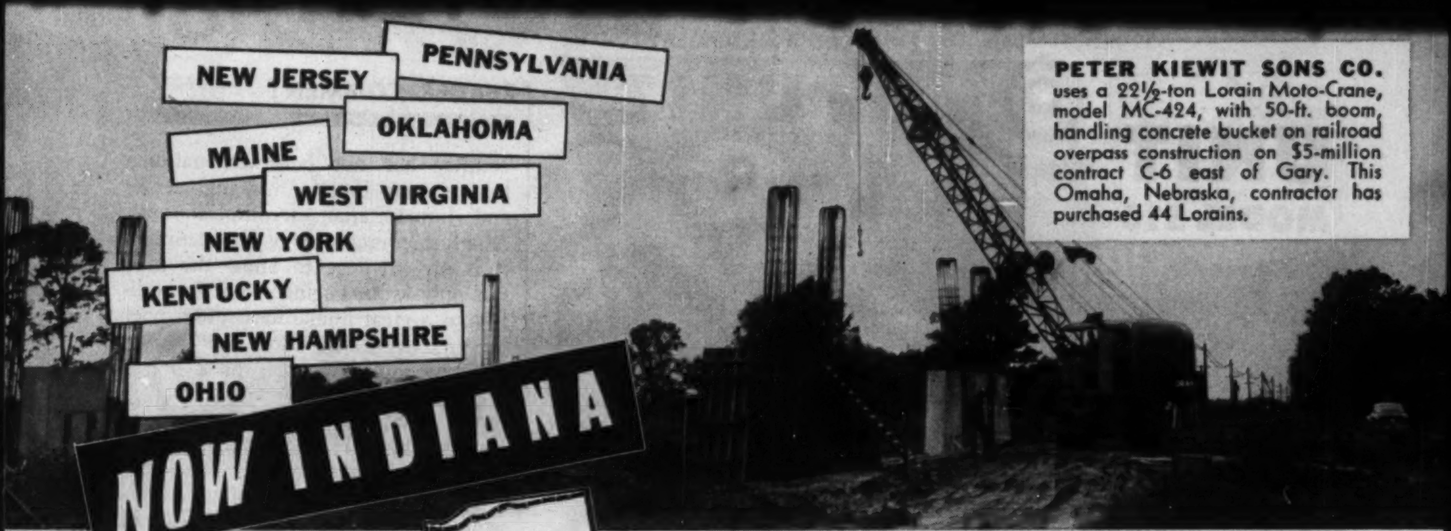
Calked type tapping sleeves are available which will fit all classes of pipe for mains 3″ through 36″ with various combinations of outlets 2″ through 16″. Calked type tapping valves are available with "O" ring or conventional packing or flanged type for post indicator, with conventional packing only—sizes 2″ through 16″.

Consult your Mueller Representative, Catalog W-96 or write direct for full details.

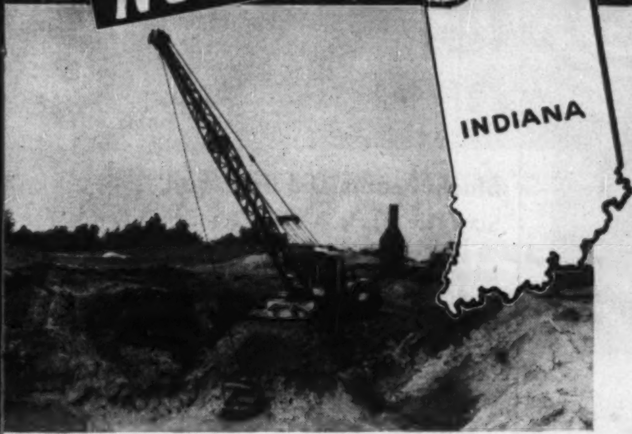
MUELLER CO.

Dependable Since 1857

MAIN OFFICE & FACTORY DECATUR, ILLINOIS



PETER KIEWIT SONS CO. uses a 22½-ton Lorain Moto-Crane, model MC-424, with 50-ft. boom, handling concrete bucket on railroad overpass construction on $5-million contract C-6 east of Gary. This Omaha, Nebraska, contractor has purchased 44 Lorains.



TAYLOR WHELESS & CO. of Jackson, Mississippi (joint contractors with Winston Bros.) use a 20-ton Lorain Moto-Crane as a dragline to excavate footings for an overpass on contracts C-17, 18, 19 ($7,500,000) near La Porte, Indiana. Also used to handle concrete, forms, steel and clamshell excavation.

ANOTHER TURNPIKE

MORE LORAINS... *MORE* PROOF!

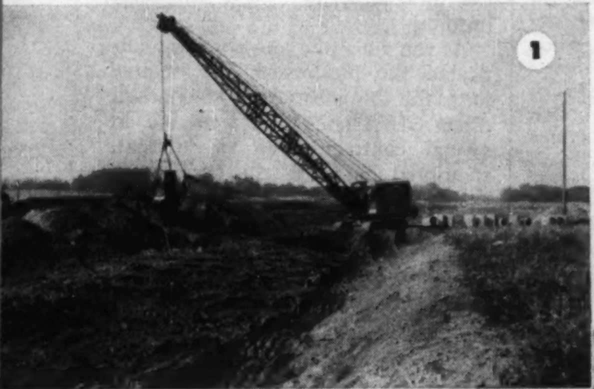
Ever since the first yard of earth was moved on America's first super-highways, Lorains have been a familiar sight . . . from the Pennsylvania Turnpike to the current Indiana Turnpike. Hundreds of Lorains have seen duty on these closely bid, tightly scheduled contracts. Contractors' names through these years on these jobs are the "Who's Who in American Construction."

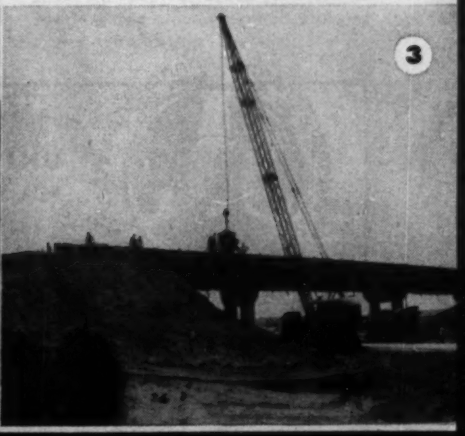
Now, the 156-mile, $280-million Indiana Turnpike is the latest of these "proving grounds" for Lorains as they help dig the 50,200,000 yds. of material, help pour the 300,000 yds. of concrete on the 260 structures, help place the 86,000 tons of steel.

Shovel-crane equipment, particularly on vast projects like this, must fit many kinds of work — digging, casting, erection, material handling, to mention a few. Lorains do that best of all because of the tremendous selection of shovel-crane sizes through 2½-yard shovels and up to 61-ton crane capacities . . . plus the convertibility to all front ends . . . plus many types and sizes of rubber-tire and crawler mountings available for any terrain or travel conditions.

Many years and many turnpikes are your proof that Lorains will lick rough, tough, fast-scheduled jobs . . . and prove they'll *move more material, faster, cheaper, on your job, too!*

THE THEW SHOVEL CO., LORAIN, OHIO





① This 1½-yd. Lorain dragline uses a 60-ft. boom to dig drainage ditches 6 feet deep, 28 feet wide, at the rate of 250-ft. per day on the Carlson-Fleming subcontract near Rolling Prairie, Indiana.

② Winston Bros. of Minneapolis (joint contractors with Taylor Wheless & Co.), an 8-time Lorain owner, use a 25-ton Lorain Moto-Crane to handle 1¼-yd. concrete buckets to pour box culverts, handling about 30 loads per hour. This Moto-Crane is assigned to many other varied duties all over the job.

③ This Lorain 30-ton Moto-Crane, model MC-524, with an 80-ft. boom pours concrete for an overpass on the S. J. Groves & Sons Co. contract near La Grange, covering 12 miles and totalling $6,740,000.

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UNIT Challenger

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READER COMMENT

country has not bestowed national honors upon him for his engineering and humanitarian accomplishments. As a former employee of Dr. Steinman it is my privilege to know the man not only as an engineer, but in addition as a great humanitarian and poet whose esthetic sense could see beauty as a necessary element in the engineering structures he designed.

Dr. Steinman has dedicated his person and his fortune to the advancement of the engineering profession as no one else has. A list of all of his activities in sponsoring the growth of the engineering profession would show achievements far in excess of any other engineer of our times.

George D. Hartley
Drahran, Saudi Arabia

Block Beams Did Not Fail

Sir: The article, "Novel Roof Fails," in ENR Aug. 25, p. 23, stressed a relationship between prestressed concrete roof joists and the failure of conventionally reinforced cast-in-place rigid-frame bents. This, I am sure, was not your intention, but readers who know nothing of the job and its background would receive this impression from the article.

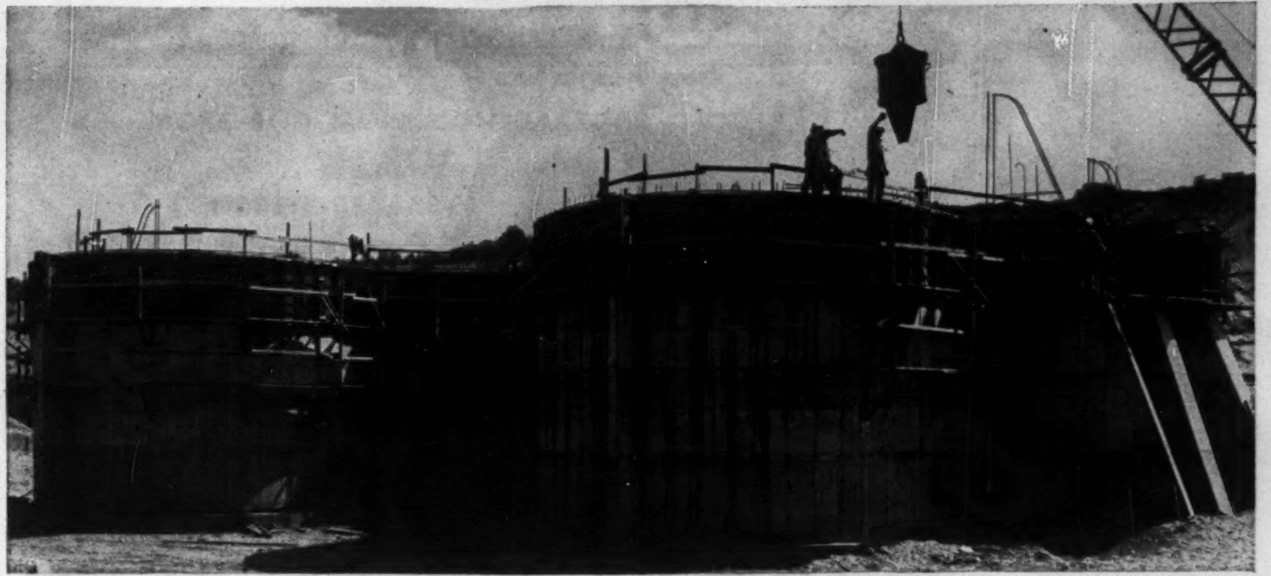
You are certainly to be commended for your promptness in reporting this serious mishap; the causes of failures as they become ascertained should be pointed out by your magazine in order that others do not make the same mistake.

As you are aware, our company fabricated the prestressed, precast roof joists for this job, which your article discussed. These joists were bid by several contractors as an alternate sponsored by us to the basic Army design.

We had an opportunity to inspect the structure with Army and Air Force Engineers on the day following the collapse. The one obvious fact to all present was that the prestressed joists had nothing to do with the cause of this failure, where three adjacent bents of continuous rigid frames failed, dropping the prestressed joists and gypsum roof deck.

We cannot answer why this cast-in-place concrete structure failed. Your article suggested that the prestressed joists toppled some of the bents, by transferring the roof load—which may or may not have been the case. Assuming that this is so, it is a definite credit to the joists, as they were continuous over the rigid bents and should be expected to react in such a tough manner. (The basic design

(*Continued on page 55*)



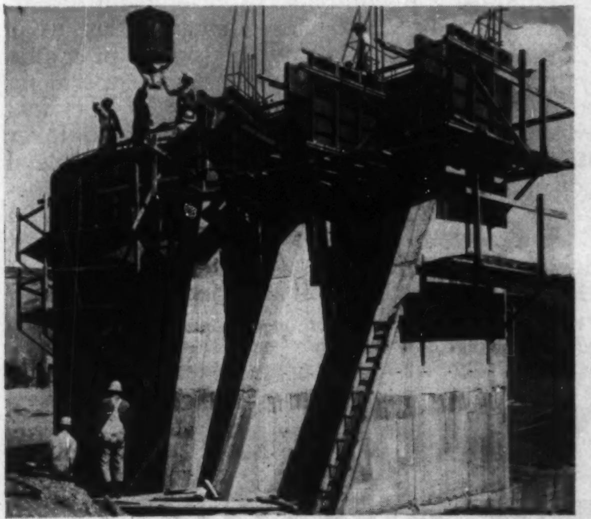
STORAGE WALLS to hold sand and gravel, designed and engineered by Kaiser Engineering Co. Symons Pre-Fab Fir Plywood Forms were called upon for the work because they could be prefabricated to fit the need and on the basis of savings in time and money. Butler Construction & Engineering Co., Seattle, Washington, is the contractor.

COST SAVINGS SELL SYMONS FIR PLYWOOD FORMS FOR 40 FT. HIGH "S" CURVED CONCRETE STORAGE WALLS

An unusual concrete construction job in Steilacoom City, Washington, involved the erection of two sharply curving free-standing concrete walls 40 feet high and 15 inches thick. The curves are shaped to a radius of 15 feet 6 inches. One wall is 190 feet long and the other is 400 feet long. They face each other across a space of 200 feet.

The curving surface of the walls posed a serious problem in forming. This was solved by the use of Symons Pre-Fab Fir Plywood Forms.

Most of the form panels were 2 x 6 feet with ¾ inch exterior *Plyform* faces framed on the edges with 2 x 4's and reinforced with steel cross members spaced 12 inches O.C. The job also required a number of filler panels 20 inches by 6 feet in which the plywood facing on each side extended past the framing 1⅛ inches, making it possible for the edges of the form to butt closely on the outside surface of the curves.

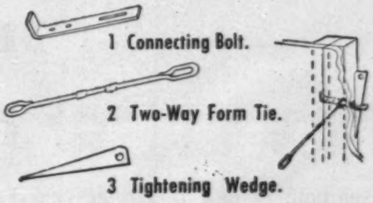


Abutment supporting ends of the 190-foot concrete sand and storage wall. Photo shows Symons Fir Plywood Forms being used for fourth pour on 40-foot high installation.

Symons Engineering and Customer Service also play an important role in projects where forming is a serious problem. The Symons Engineering Staff will furnish complete form layouts and job cost sheets on the form work—at no charge to the contractor. This service enables the contractor to get a clear picture of his job (its cost, bill of materials and labor saving methods). Symons fieldmen give regular on-the-job service. First, by on-the-job recommendations of forms and hardware needed. Second, by showing the workmen how to set up the forms efficiently. Third, by making special deliveries when last minute problems arise.

Symons Forming System includes just 3 pieces. TWO WAY FORM TIE which holds form securely to the required wall thickness without washers, spreaders or walers. Tie-ends are broken back within wall by a half-twist after forms are removed. TIGHTENING WEDGE is inserted through the slot in the connecting bolt and pulls form sides tightly together. CONNECTING BOLT which is slotted passes through edges of adjacent forms and tie loop.

JUST 3 PIECES



The Symons Forms are available on a Rental-Purchase Plan which offers contractors the opportunity to use the Symons Forming System on a rental basis . . . with all rental charges to apply on the purchase price, during a 60-day period.

Contractors throughout the country have tried this plan and like it. Send in your request for the complete facts—no charge or obligation.

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J. W. Moorman and Son maintains an inventory of Aeroquip bulk hose and fittings at the Buford Dam Project.

50 pieces of heavy equipment work multiple shifts on the Buford Dam Project now under construction at Buford, Georgia, by J. W. Moorman and Son. 10 maintenance men and 2 service trucks are required to keep the equipment on the go. And a compact inventory of Aeroquip's bulk hose and fittings meets all fluid line replacement needs.

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● Portability and Performance. There's the answer.

First let's consider portability. The 81 consists of two main units, each complete on its own pneumatic-tired chassis, ready to pull in or pull out at a minute's notice. No holes to dig, no special alignment necessary. Just pull in, hook up, lay pipes, and go to work.

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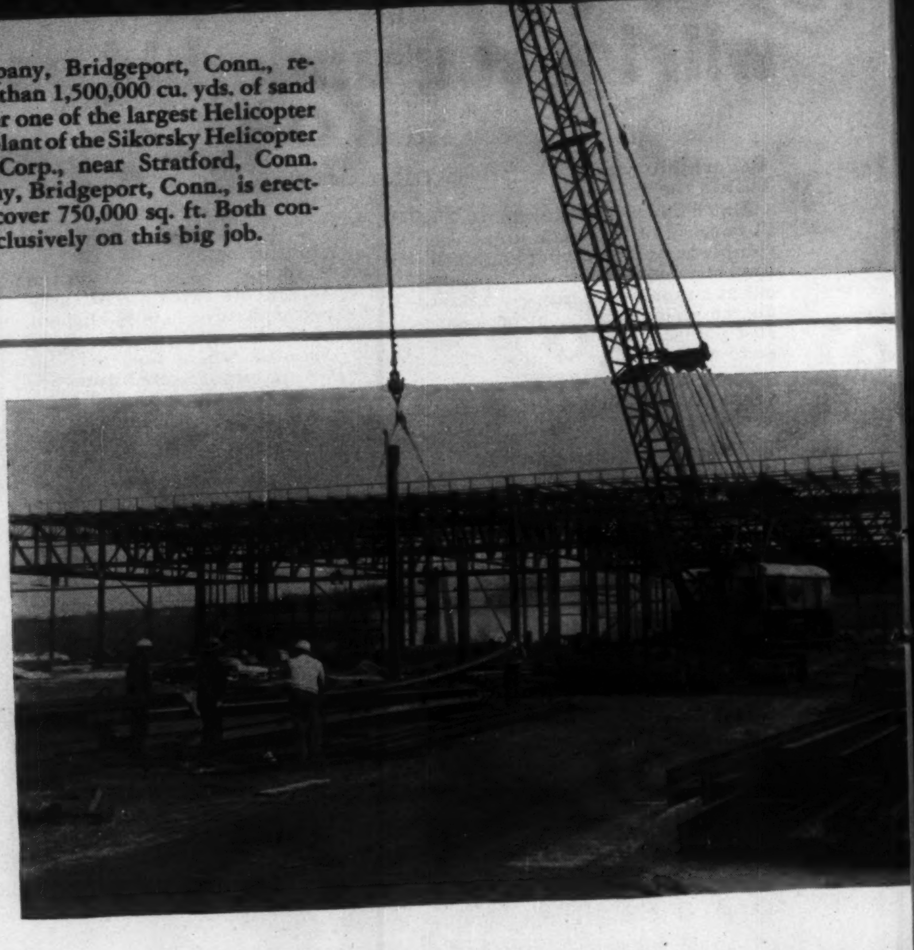
GULF PRODUCTS

D'Addario Construction Company, Bridgeport, Conn., recently completed moving more than 1,500,000 cu. yds. of sand and gravel to prepare the site for one of the largest Helicopter plants in the U.S.—the branch plant of the Sikorsky Helicopter Division of United Aircraft Corp., near Stratford, Conn. Harris Structural Steel Company, Bridgeport, Conn., is erecting the buildings, which will cover 750,000 sq. ft. Both contractors used Gulf products exclusively on this big job.



and **FINE SERVICE** *keep equipment rolling on helicopter plant project —one of largest in the U.S.*

Another important construction project where equipment is making an outstanding record of smooth, dependable performance with the help of Gulf quality petroleum products and all-round service on the job.

Here are some of the reasons why leading contractors like D'Addario Construction Company and Harris Structural Steel Company prefer to be served by Gulf: Gulf lubricants provide an extra margin of protection. Gulf fuels contribute to full power and top performance of equipment. Gulf supplies prompt delivery service and helpful petroleum engineering counsel.

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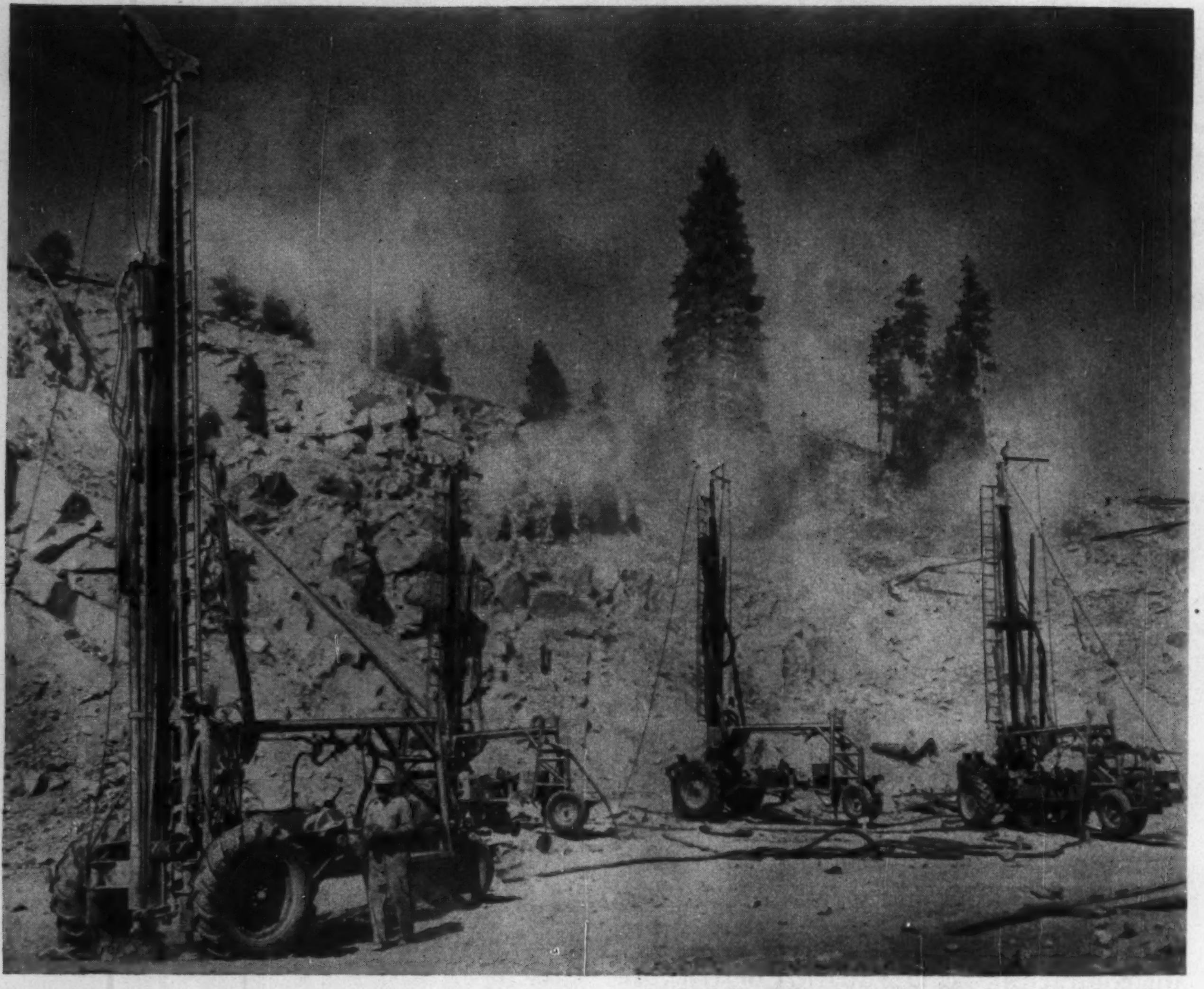
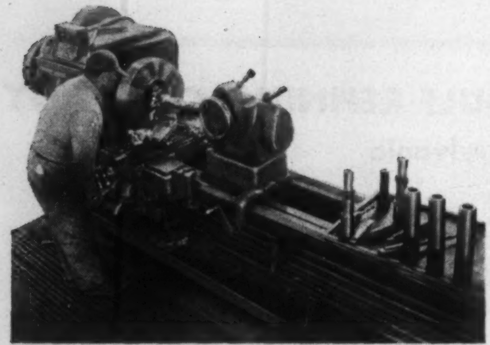


Crucible hollow drill steel at work on site of new Cherry Valley Dam.

A BIG BITE... 1½-million yards of hard granite



Machining a shank adaptor of Crucible Max-el 3½ alloy steel, for use on Joy *Challenger* drill.

That's the amount of hard rock the Guy F. Atkinson Company has now drilled through in constructing the new Cherry Valley Dam near Sonora, California.

For this tough job, two-inch round Crucible *Crusca* hollow drill steel is being used in eight big Joy *Challenger* drills.

As on so many other big jobs, Crucible drill rods were chosen because experienced construction men *know* they can depend upon them for *lowest cost per foot of hole drilled* — even under the most rugged conditions. And with good reason. For Crucible hollow drill steels are made to *tool steel* standards, by the country's leading producer of tool and other special purpose steels.

Choose them for your next job. You'll get top drilling efficiency, at lowest cost. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

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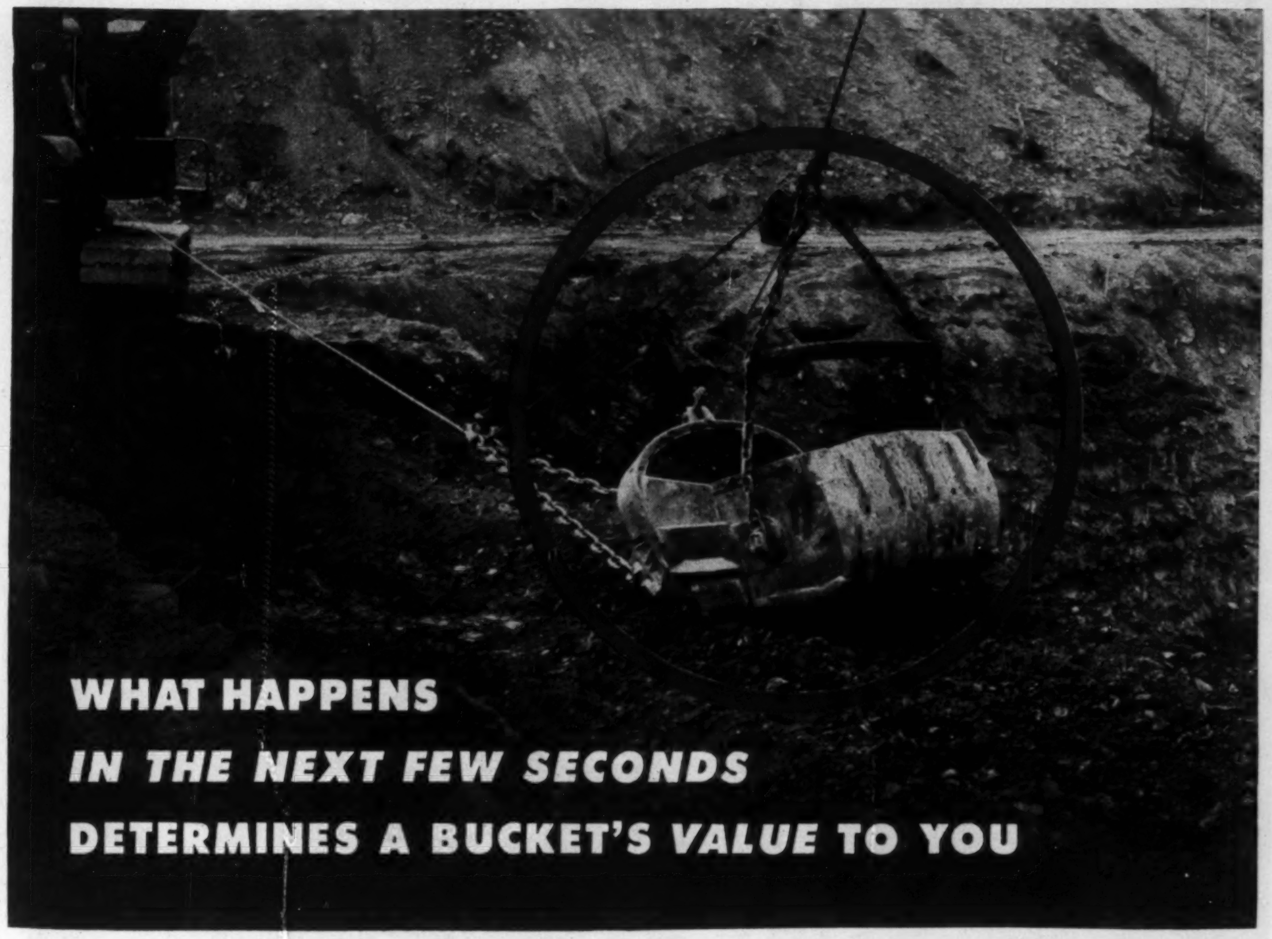
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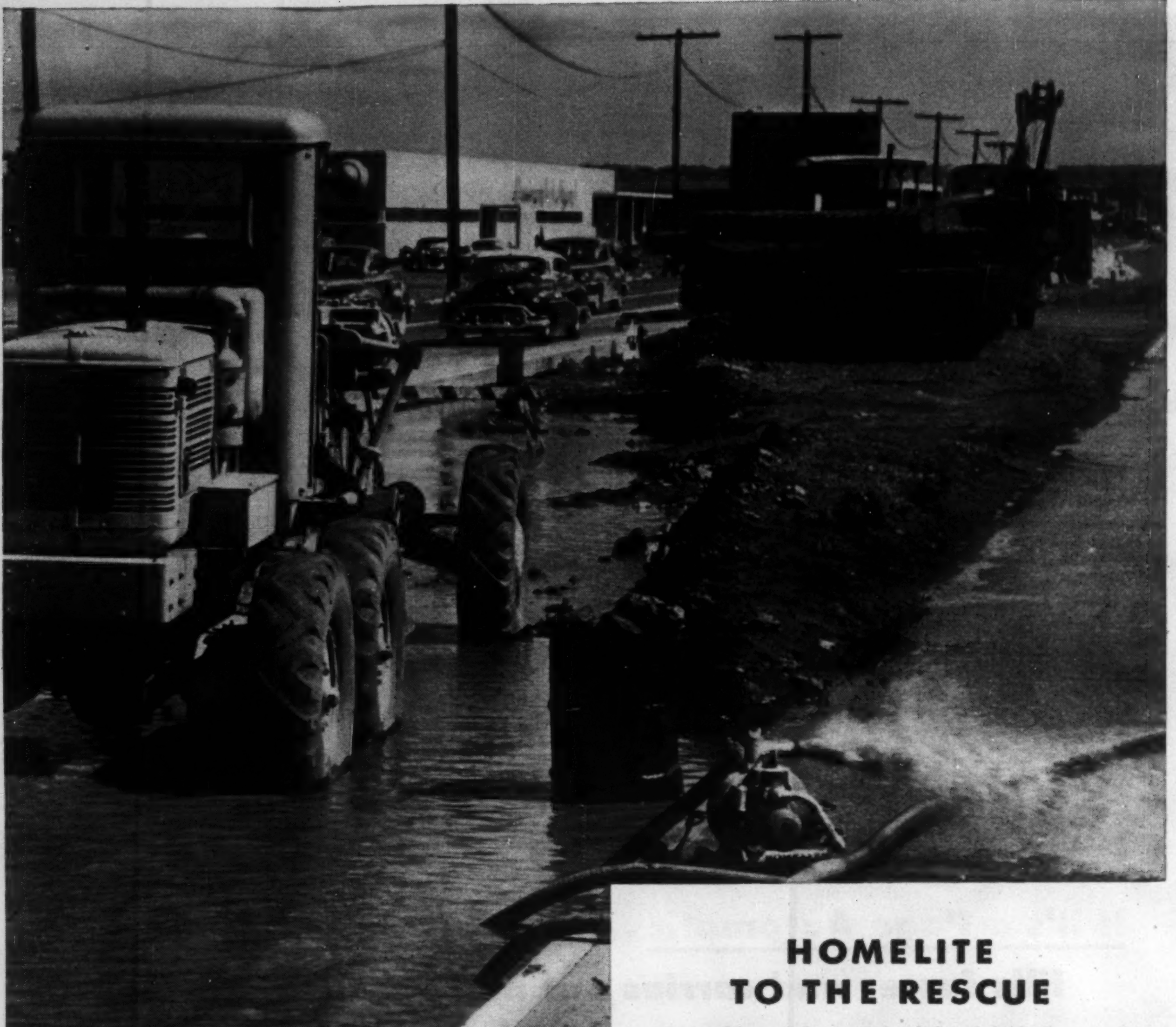

HOMELITE TO THE RESCUE

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1109 Riverdale Avenue, Port Chester, N. Y.

called for continuous joists of conventional cast-in-place concrete, which undoubtedly would have also carried a portion of the load of the falling girder over to the next adjacent girders.) It appears that this very toughness of the prestressed joists may have delayed the falling roof long enough to permit depot employees to get out from under.

It is also significant that not one of the three rigid frames failed at the juncture with the precast, prestressed joists. Where the joists were pulled loose at the fire-wall spandrel beam, cast-in-place concrete pulled out and remained bonded to the precast concrete.

While the construction of this roof using precast prestressed joists is undoubtedly considered novel by some people, as the headline of your article states, there certainly is nothing novel about the rigid frame bents, which in this instance was the cause of collapse. The prestressed concrete was in no way related to the failure.

GEORGE W. VAUGHT
Concrete Masonry Corp.
Elyria, Ohio

CALENDAR

International Road Congress, Dolmabahce and Yilditz Palaces, Istanbul, Turkey, Sept. 26-Oct. 16.

Building Research Institute, conference on metal curtain walls, National Academy of Sciences, Washington, D. C., Sept. 28-29.

American Public Works Association, congress and equipment show, Milwaukee, Wis., Oct. 2-5.

First National Prestressed Concrete Short Course, Maritime Base, St. Petersburg, Fla., Oct. 10-12.

National Society of Professional Engineers, fall meeting, Peabody Hotel, Memphis, Tenn., Oct. 14-15.

Southeastern Association of State Highway Officials, annual convention, Charleston, W. Va., Oct. 17-19.

National Council of State Boards of Engineering Examiners, annual meeting, Sheraton-Park Hotel, Washington, D. C., Oct. 20-22.

Institute of Traffic Engineers, annual meeting, William Penn Hotel, Pittsburgh, Pa., Oct. 23-27.

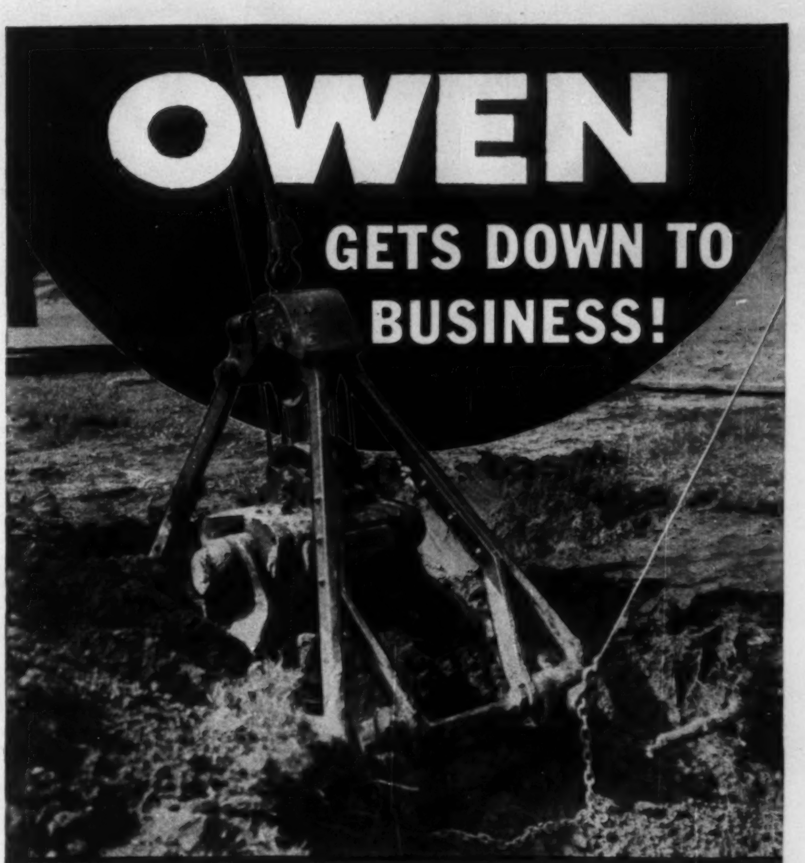
American Society of Civil Engineers, annual meeting, Statler Hotel, New York City, Oct. 24-28.

California Section, American Water Works Association, meeting, Memorial Auditorium, Sacramento, Calif., Oct. 25-28.

Associated General Contractors of America, Inc., Carolinas Branch, annual convention, Bon Air Hotel, Augusta, Ga., Oct. 30-Nov. 2.

American Concrete Institute, southeast regional meeting, Atlanta Biltmore Hotel, Atlanta, Ga., Oct. 31-Nov. 1.

Structural Clay Products Institute, convention, Greenbrier Hotel, White Sulphur Springs, W. Va., Oct. 31-Nov. 2.



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Before he put Macks on his jobs, his monthly maintenance costs averaged more than $1,000. Since switching to an all-Mack operation of sixteen mixers and dumpers, he finds these average monthly costs for his entire fleet have been cut to less than $100!

As Mr. Allen puts it, "Macks have made an important contribution to the success of my business. In my opinion, Macks are the finest equipment ever built. They have no equals for long life, dependable service, minimum down time and low-cost operation."

High praise for Mack performance? You bet! But ask other owners and operators of Macks throughout the country and see how they agree with Mr. Allen. It's no wonder that in the construction industry the "word" is—it pays to standardize on Macks.

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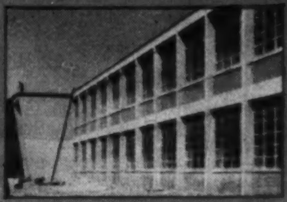
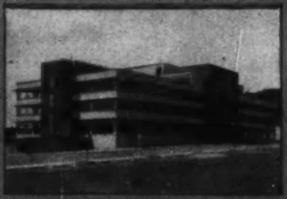
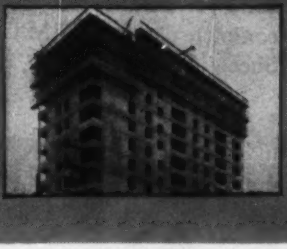


SCHOOL—Paxon Field School at Jacksonville, Florida. Built in 1954 by East Coast Construction Company. President C. Bernard reports, "Harborite panels were re-used twenty times on each side...expect another twenty uses. Edges held up exceptionally well under rough usage and the finished concrete had a smoother finish than that obtained with other form materials."

ARENA—Livestock arena at the State Fair Grounds in Raleigh, North Carolina has drawn international acclaim for beauty and design. Harborite concrete form panels were used in construction of this unique structure. Seats 5400 spectators. Erected in 1953 by William Muirhead Construction Company. Architects were Matthew Nowicki and William Henry Dietrick.



OFFICE BUILDING—New headquarters for the Tacoma City Light offices completed in 1954. Roy T. Earley Construction Company used Harborite concrete form panels for entire exterior surface of building...re-used on adjoining shop building. Contractor says "...more than normal number of re-uses, stripping was easy, finish was held to a minimum." Architect was Silas E. Nelson of Tacoma.



APARTMENT—An outstanding new landmark on Seattle's skyline is the 900 University Apartment house. Harborite concrete forms were used exclusively on the exterior of this 22-story building. Only one set of forms was built. Says contractor Louis E. Baldwin, "These forms have been used 22 times each...are in good enough shape to use on another building of similar size. We recommend Harborite to any contractor." Architect, Earl W. Morrison.

Eighteen years of use in every type or concrete construction has proved that Harborite produces better jobs at lower cost. Harborite's medium-high density overlay is manufactured specifically for concrete form work. Tough, smooth surface will produce glasslike concrete until literally worn away through use. Re-use factor is exceptionally high—50 being common, 2 to 3 times amount not unusual. Special solid core construction of SUPER-Harbord boat plywood adds extra strength and durability. There is no plywood made that matches this material in all 'round quality.

Lower-than-average initial cost combined with high re-usage means important dollar savings. This, with the superior appearance of the finished concrete job, adds up to features that make Harborite a must for cost-and-quality-conscious contractors.

Look at these Harborite advantages:

- ✓ Designed especially for multi-use concrete forms.
- ✓ Extremely tough, smooth overlay completely hides wood grain, knots and flaws; won't check or split; produces perfect concrete surfaces.
- ✓ Resin-impregnated overlay has great affinity for oils, sealers and lacquers.
- ✓ Will not bleed, run or discolor concrete.
- ✓ Solid core of best plywood made—SUPER-Harbord, the original boat plywood.
- ✓ Lower-than-average initial cost, high re-usage.
- ✓ Oiled and edge-sealed at factory.
- ✓ Available in oversize panels as well as standard 4′ x 8′ sizes, any thickness.

One of the royal family of plywoods manufactured only by

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Big savings. These corrugated sheets make possible low application costs—they need only a minimum of cutting or fitting. And they offer the extra money-saving feature of needing little or no upkeep.

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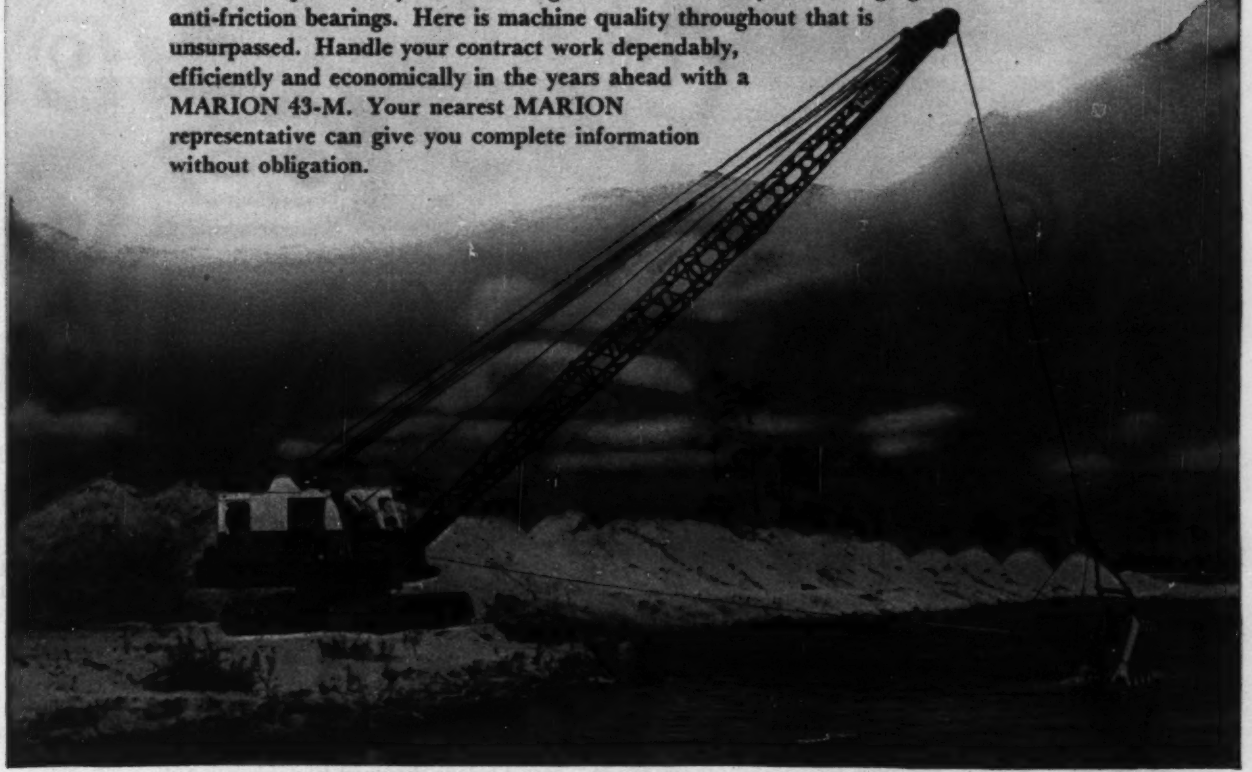
● The muscle, brawn and speed of the MARION 43-M give you a big production machine, as a 1 cubic yard shovel — as a 1 or 1¼ cubic yard dragline—as a crane with a 20 ton rating—as a 1 cubic yard backhoe—or as a pile driver with boom lengths up to 80 feet.

The 43-M travels easily on a carryall, and is readily convertible from shovel to crane work. MARION Air Control helps make it a fast worker, easily controlled without operator fatigue.

Unusual dependability results from generous use of alloy steels, forgings and anti-friction bearings. Here is machine quality throughout that is unsurpassed. Handle your contract work dependably, efficiently and economically in the years ahead with a MARION 43-M. Your nearest MARION representative can give you complete information without obligation.



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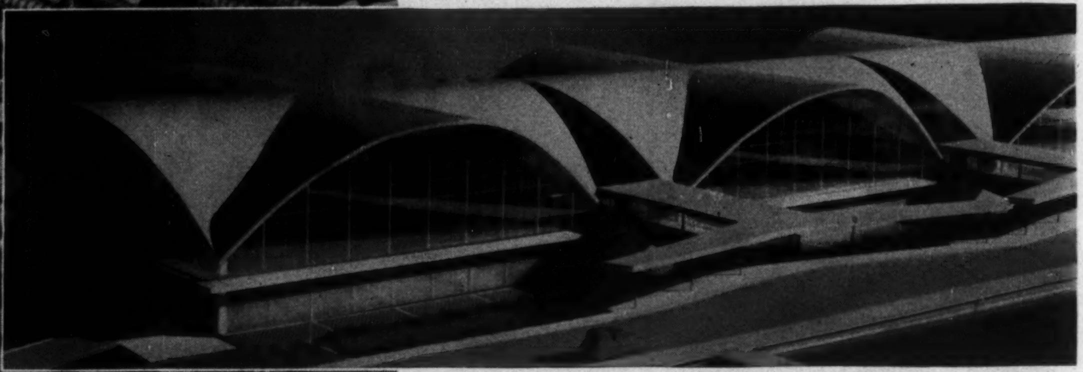
Laclede Reinforcing Bars

. . . the "backbone" that gives strength and support to St. Louis' amazing new Airport Terminal Building



A bold new approach to airport terminal design has made the unusual structure pictured above, now being completed at St. Louis' Lambert Municipal Airport, a sensation in the architectural and construction world.

The obvious focus of attention is the massive but graceful roof, formed of huge intersecting cylindrical shells of concrete, 120 feet wide but only 4½ inches thick. The illusion is one of lightness and airiness, belying the roof's actual weight of 3,000 tons.

Because there are no internal supports, inherent strength is of special importance in a building of this type.

Much of that strength is provided by the use of Laclede Multi-Rib Round Reinforcing Bars, not only in the roof but throughout the entire terminal.

These Laclede-designed bars represent the perfect balance between high strength and maximum anchorage, and are enjoying ever-widening use by contractors throughout the nation.

Architects:
Hellmuth, Yamasaki &
Leinweber, St. Louis
Structural Engineer:
William C. E. Becker, St. Louis
Engineering Consultant:
Roberts & Schaefer Co., Chicago
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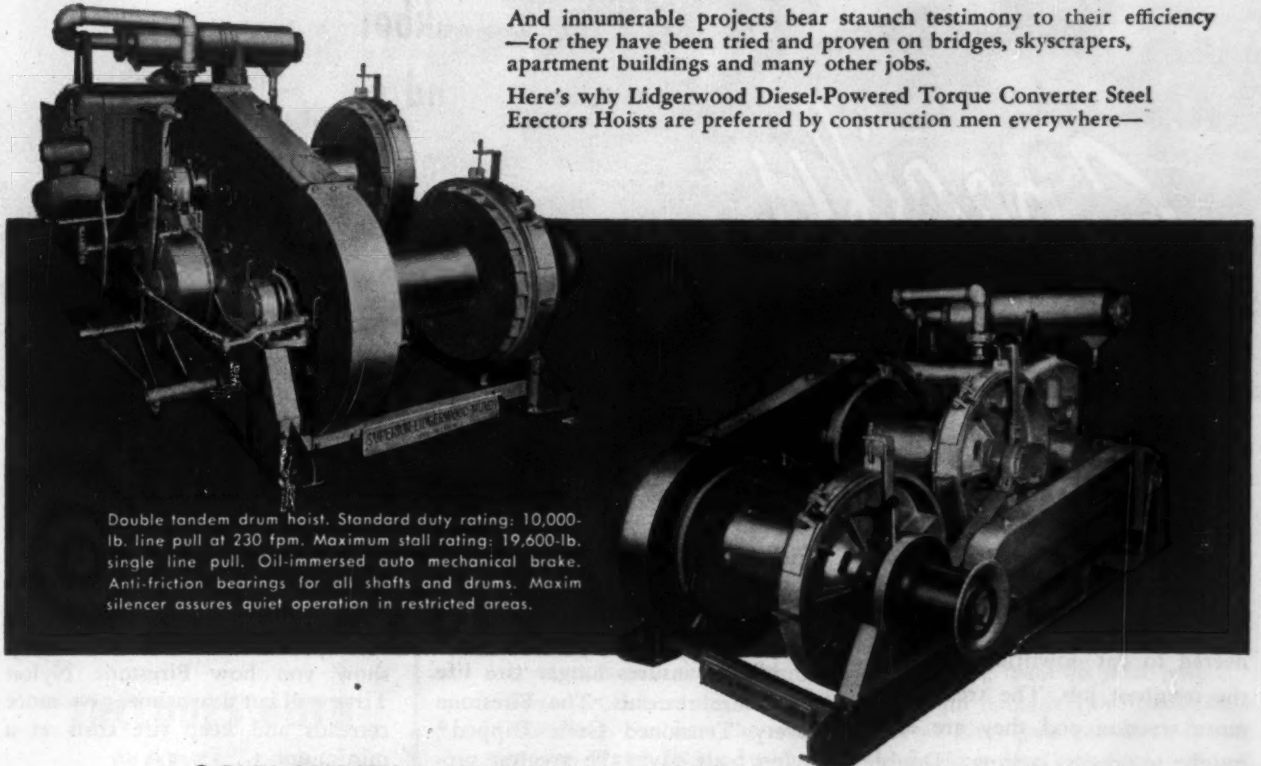
Lidgerwood Diesel-Powered Torque Converter Steel Erectors Hoists give you "Floating" Power for heavy loads

Pioneered by Lidgerwood in 1945—and reflecting over 200 years of accumulative engineering experience—Lidgerwood Diesel-Powered Torque Converter Steel Erectors Hoists make light work of heavy loads wherever they are used.

And innumerable projects bear staunch testimony to their efficiency—for they have been tried and proven on bridges, skyscrapers, apartment buildings and many other jobs.

Here's why Lidgerwood Diesel-Powered Torque Converter Steel Erectors Hoists are preferred by construction men everywhere—



Double tandem drum hoist. Standard duty rating: 10,000-lb. line pull at 230 fpm. Maximum stall rating: 19,600-lb. single line pull. Oil-immersed auto mechanical brake. Anti-friction bearings for all shafts and drums. Maxim silencer assures quiet operation in restricted areas.

- **EASY OPERATION**—a single lever gives 100% speed and load control.
- **INSTANT RESPONSE**—you can literally "float" heavy loads into place with watch-like precision.
- **PERFECT CONTROL**—you get all the smooth, flexible control of a steam hoist, plus the added advantages of greater economy and lighter weight.
- **SMOOTH POWER**—Torque converter permits a multiplicity of line pulls and speeds by simply throttling the engine.

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The new Firestone Safety-Tensioned Gum-Dipped* nylon cord body insures longer tire life and more retreads. The Firestone Safety-Tensioned Gum-Dipped* nylon body gives the greatest protection against impact breaks . . . flex breaks . . . heat failures . . . and water damage.

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*T.M. Reg. U.S. Pat. Off.

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For savings you can bank on, try this loading team on your job!

First—get behind the wheel and check it for maneuverability and ease of handling. See how the touch of a lever gives you instant hydraulic response. Watch its big bucket lower and take a deep bite. Feel the surge of power as it lifts and dumps.

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Then—find out how little this tractor and loader cost! Also find out about the thirty-five drawbar horsepower** Model 820 Ford Tractor and Industrial Loader priced slightly higher. Each is by far the *lowest priced loader package in its power class!*

See for yourself. Call your nearby Ford Tractor and Equipment Dealer right now and arrange for a free demonstration!

Based upon a comparison of manufacturers' suggested list prices **Manufacturers' rating

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FORD MOTOR COMPANY
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***INCLUDES BOTH**
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AND
HEAVY-DUTY
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Ford
TRACTORS

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When you do you'll get fast-acting, quick-accelerating 2-cycle Diesel power that will help you do more work, faster, at less cost.

More work, because a General Motors Diesel is a "high torque" engine. And torque—as much as developed horsepower—measures an engine's working ability.

Faster work, because a GM 2-cycle Diesel, with its responsive governor, efficient fuel injectors and power at every piston downstroke, gives you instant pickup in response to changing loads.

Less cost, because a General Motors Diesel burns fewer gallons of safer, cheaper fuel. Also a GM Diesel costs less to buy and the parts cost less than for other Diesels of comparable ratings.

No matter where your contracts take you, you'll find GM Diesel distributors ready to supply fast service and quick delivery of low-cost factory parts. Check your local distributor today for full details on dependable, low-cost Diesel power for your equipment, or write direct for more information.

PURCHASED 23 GM DIESELS SINCE 1947

This LeTourneau-Westinghouse Tournapull is part of an earth-moving fleet used by the Lone Star Steel Company of Lone Star, Texas. The Company, one of the largest producers of steel in the Southwest, has been a consistent user of General Motors 2-cycle Diesel engines in several different kinds of earth-moving, construction and mining equipment for better than seven years.

GM
GENERAL MOTORS
DIESEL
POWER

SAVING $170.00 A MONTH IN FUEL ALONE

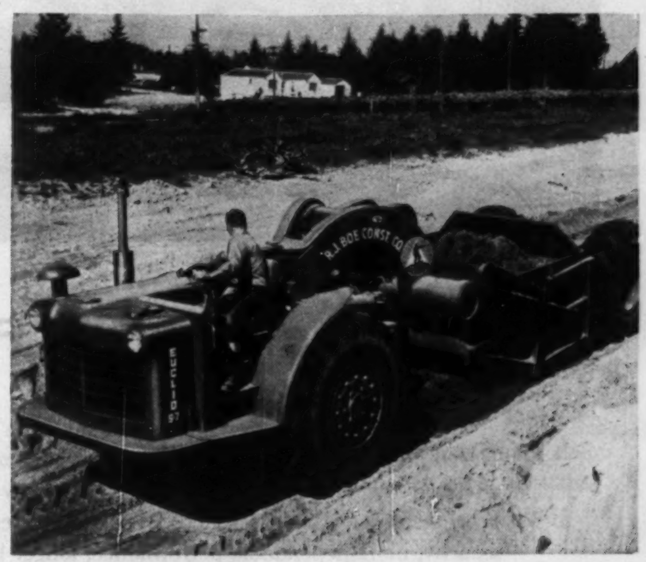
United Construction Company cut fuel costs over 60% and reduced maintenance costs when they *switched* from gasoline to GM Diesel power on their Moretrench pumps. The GM Diesels worked 24 hours a day, 7 days a week—eliminated stops formerly required to pull and service spark plugs every three days and to replace them every three weeks.

13,000 HOURS—NO REPAIRS

General Contractor A. H. Famularo bought this GM Diesel-powered Northwest 25 Crane in April 1947. In 13,000 hours he never had an injector out, never touched the head or pan. He burns 16 gallons of low-cost Diesel fuel in 8 hours—specified GM Diesel power "because it was economical . . . and has proved to be reliable."

25% MORE WORK; FUEL COSTS ⅓ LESS

Killough Construction Company has *standardized* on GM Diesel power for their portable rock crushing plant in Kansas. The firm uses six GM Diesels to run a hammer mill, operate conveyors and screens, a primary crusher and two shovels. One shovel, converted from gasoline to GM Diesel power, now does 25% more work on one-third less fuel cost.



"WONDERFUL PERFORMER"

This GM Diesel-powered scraper hauled nine yards every four minutes on a recent job for the R. J. Boe Construction Company. Contractor Russell Boe likes the "wonderful acceleration and trouble-free performance GM Diesel power gives me." He says, "All you need to do is keep water, oil and clean fuel in that GM Diesel and you'll get a good day's work out of it."

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Single Engines . . . 30 to 300 H.P. • Multiple Units . . . Up to 893 H.P.

Build for the Future . . .

on a Lock Joint "Foundation"

City planners and engineers are taking a long, hard look at everything connected with water supply — the most serious problem affecting the city's future growth. That's why so many cities, all over the world, have selected Lock Joint Pressure Pipe's greater security, more dependable performance, longer life. They know that their plans for meeting future water supply requirements must include pipes whose high carrying capacity will be as great scores of years from now as it is today.

In addition to a solid foundation for the water supply system of the future, Lock Joint Pressure Pipe offers important economies — low first cost, economical installation, low pumping costs and negligible maintenance charges.

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ENGINEERING NEWS-RECORD

Vol. 155, No. 13 September 29, 1955

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THE CONSTRUCTION WEEK

TURNPIKE MILESTONE—The Ohio Turnpike Commission this week proudly prepared for the grand opening on Oct. 1 of its 241-mi toll road across the northern part of the state between the Pennsylvania and Indiana borders (Page 71).

That the project met its deadline was of special significance because of the celebrated litigation that long delayed award of initial construction contracts. Few issues in recent years had so stirred the engineering profession and construction industry as the 1953 court battles over whether the Turnpike Commission was within its rights in calling for bids for concrete paving only.

The Ohio Supreme Court ended the year of intense controversy and gave the green light to construction by its far-reaching ruling that the commission was under no obligation to take alternate bids and that its judgment in selecting a specific material was not properly open to legal challenge as long as rendered in good faith.

WORKS BOTH WAYS—By coincidence, it was noted this week that the Connecticut Highway Department has begun taking alternate bids on the 129-mi turnpike now under construction between Greenwich on the New York line and Killingly on the Rhode Island border (Page 71). This project originally was designed for portland-cement concrete paving.

NEVER A DULL MOMENT—Almost every turnpike project, it seems, has to have its ups and downs. Jacksonville interests, for example, are raising Cain over engineers' recommendations that the Florida Turnpike by-pass their city (Page 76). But, Texas has come up with the prize dilemma: Will a private or public agency build the Dallas-Houston turnpike? (Page 371).

Privately-owned Texas Turnpike Co. has the exclusive franchise, but was unsuccessful in selling its bonds early this year. Now the Texas Turnpike Authority is thinking of having the engineering data re-checked to see if it is feasible for a private company to finance the toll road. The private group is going to try again soon to sell $130 million in bonds. But many Wall Streeters are doubting the bonds can be sold at a reasonable rate in today's tight market.

PULSE-TAKING—AGC came up this week with a happy prognostication, as its governing and advisory boards assembled in Minneapolis for their mid-year meeting. Polling its 84 directors and 124 chapters, AGC found:

85% to 90% of the general contractors in building, highway and heavy construction expect the record volume of work chalked up so far this year to continue or even go up in the next six months . . . with competition for jobs intensifying.

BORDEN

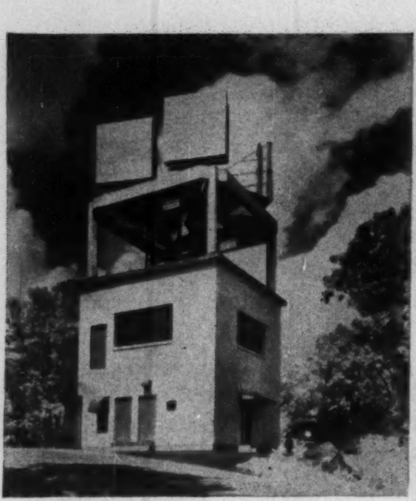
First IN FLOOR GRATING

USES OF GRATING . . . WHERE ONLY BORDEN QUALITY WOULD DO . . .

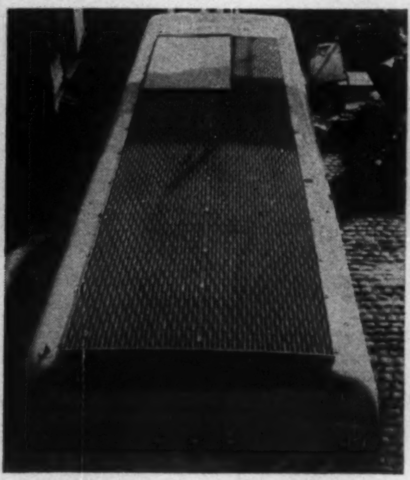
Here on this page are a few of the many new or unusual uses for grating being pioneered every day. Each is an exacting job where only standards of quality equal to BORDEN'S will do.

And remember . . . BORDEN manufactures every type grating in ferrous and non-ferrous metals.

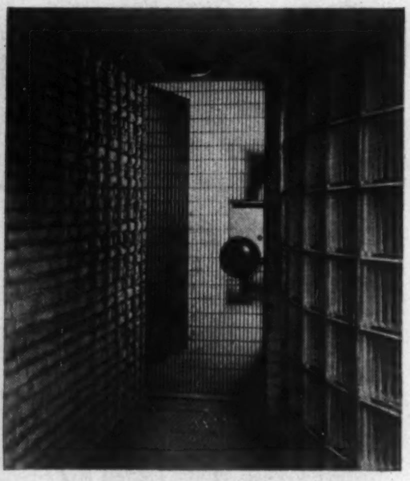
GRATING PLATFORMS for Scales . . . Will not collect snow, ice or become waterlogged; need balancing much less frequently; require no maintenance, yet bring you years of reliable service.



Television relay stations and radar stations that gird our continent have adopted grating as standard outside platform material. It will not collect snow as most other platforms will.



Wherever this Color Television truck goes, whatever the assignment of the reporters who must mount its roof, Borden riveted *serra-crimp* grating will mean surerfooting —even in ice or snow.



Only the finest precision manufacturing would satisfy the architect who designed this door. BORDEN is recognized as a leader in quality, custom-manufactured gratings.

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SOUTHERN PLANT—LEEDS, ALA. — MAIN PLANT—UNION, N. J.

WASHINGTON OBSERVER

Report on who should pay how much of highway costs will be ready by January according to officials of the Bureau of Public Roads. This assignment was given to bureau by Chairman Fallon of the House Roads Subcommittee.

Bureau has all divisions working up figures on how much damage is done to highways by trucks, passenger cars, buses, etc. Actually, Congress will determine who pays how much—but the Bureau of Public Roads report is, in fact, going to be taken by many as the answer to the thorny question of how to distribute additional taxes on highway users to pay for the new highway building program both the Administration and Democrats want.

The project has top priority inside the bureau. It is being supervised closely by three officials: Francis V. du Pont, Commerce Secretary Weeks' personal highway expert; C. D. Curtiss, Commissioner of the Bureau; and Frank C. Turner, former secretary of the Clay Committee who is charged with coordinating all the work on the project.

New tests sponsored by the Western Association of State Highway Officials in Idaho will provide BPR with latest evidence on the effect of truck traffic—this time on asphaltic concrete pavements.

Insiders expect the new report to show about the same conclusions as earlier tests on Portland cement concrete pavements—trucks do most of the damage.

•

The Administration has turned thumbs down on help for aluminum expansion. Mobilization Chief Flemming, as expected, has now made it official that the long-debated "third round of aluminum" expansion based on a variety of government aids to private producers will not be approved. From here on out, expansion will have to be undertaken by private capital without government commitments that help eliminate much of the risk.

Flemming also turned down more tax amortization for steel plants.

•

Housing officials have set their policy on allotting public housing projects. And rules will be spelled out this week officially by Public Housing Chief Charles Slusser. This year's program involves 45,000 units to be contracted for; this is 10,000 more than last year's law allowed.

Projects will go to cities that show the most need—backed up by the financial rating to carry it, plus plans that meet the government's standards. Geographical spread won't count especially.

Some 90,000 units are involved in planning loans already made by the agency. These plans are in various stages of completion—but it's expected that perhaps 65,000 units will be in competition for the 45,000 units to be contracted for this year.

Puerto Rico is already slated for 2,500 units. Cities will get their federal and annual contribution contracts starting around the beginning of next year.

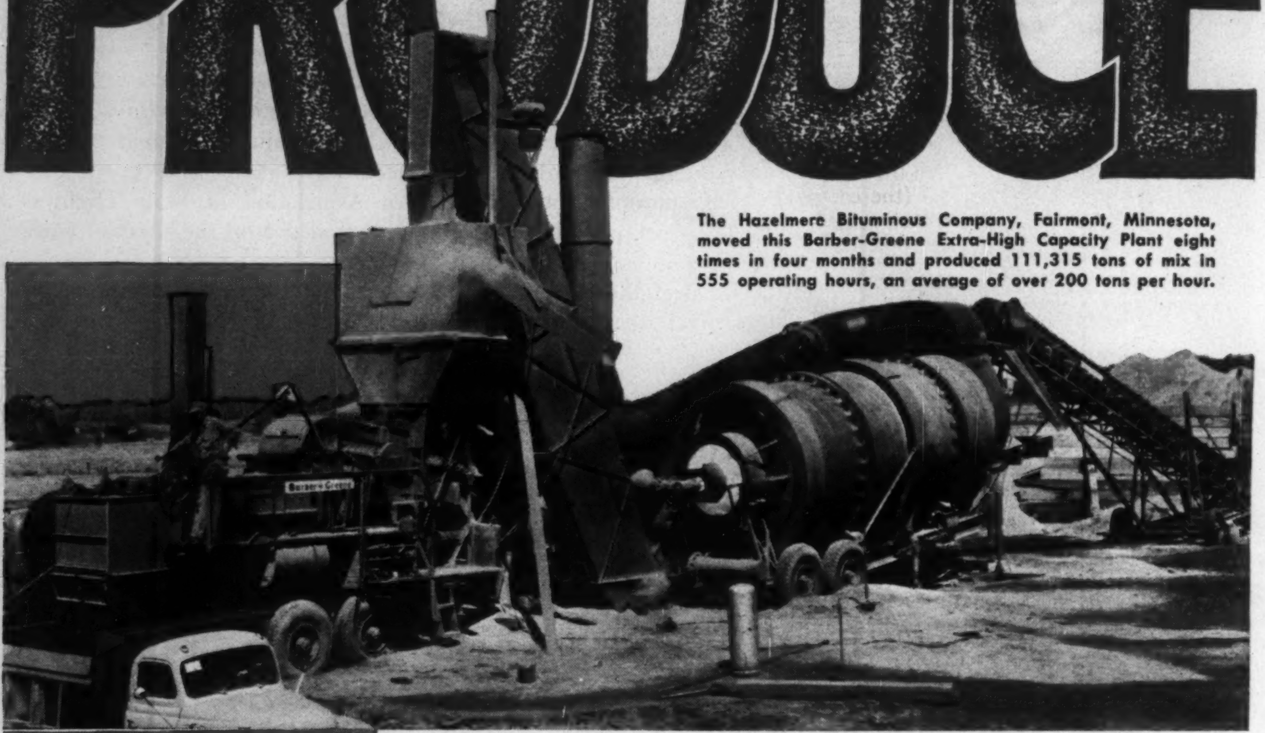
Projects won't be refused a city because it has no "workable program" of the kind now required for urban renewal help from the government.

•

New recommendations on federal building standards are available from the General Services Administration.

The standards apply to all federal office and commercial-type buildings. The new criteria for materials and design were drawn up by the Building Standards Advisory Panel appointed by Public Buildings Commissioner Peter A. Strobel about a year ago. Public Buildings Service has available a 20-page summary of the new standards; it contains all the main suggestions of the panel adopted by PBS and GSA.

PRODUCE



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Ohio Turnpike Opens on Time

Motorists will save over 3 hours, truckers 5 on 241-mile four-lane toll highway linking Pennsylvania and Indiana

Full-scale operation of Ohio's 241-mi turnpike is scheduled to get under way promptly at 12:01 AM, Oct. 1. At that time all barricades on the western 219 mi will be removed (the eastern 22 mi has been operating since Dec. 1 of last year) and traffic will start flowing over the entire $326-million toll road.

The free-flowing, four-lane divided toll highway connects at its eastern terminus with the Pennsylvania Turnpike; and at its western terminus with the Indiana Turnpike, now under construction.

In traversing the entire 241 mi of turnpike across northern Ohio, the average motorist will save three hours and twenty minutes in travel time, and the average trucker will save five hours. But this saving in time is only one of many features designed, engineered and built into the turnpike for the safety, comfort and convenience of the motorist.

• **Safety first**—Everything possible has been done to make this the safest of superhighways. Some of the safety features are unique even among toll roads. To point out a few:

• Wide shoulders—The 24-ft-wide eastbound and westbound roadway pavements of Portland cement concrete have bituminous paved shoulders, 8 ft wide on the inside for extra maneuvering room in emergencies and 10 ft wide along the outside for emergency parking.

• Intersections at grade—It is strictly a limited-access superhighway. All intersecting highways and railroads are carried either over or under the turnpike. A total of 282 structures carry highways over or under the turnpike and 40 structures carry railroads over or under the turnpike. In addition, there are 38 bridges over streams and 251 drainage structures.

• Restricted entry—No traffic will enter or leave the turnpike roadways except at interchanges, terminals and service plazas. There are 15 interchanges, each containing a toll plaza; 16 service plazas arranged in pairs along the turnpike; 8 maintenance areas; and one terminal with toll plaza near each end of the turnpike.

• Wide median strip—The opposing roadway pavements are separated by a 56-ft seeded and sodded median. It is depressed to facilitate drainage and snow removal, and to discourage motorists from crossing from one pavement to the other. This 56-ft separation of roadways is maintained over rivers, railroads and other highways by using twin bridges to carry the turnpike roadways.

• Fences and guard rails—The entire right-of-way is fenced along both sides to keep animals and pedestrians off the turnpike. And guard rails afford protection at structures and along embankments higher than 10 ft.

• Grades are easy—Maximum grades are 2% ascending and 4% descending. Minimum sight distance is 900 ft and maximum curvature is 2½ deg.

• Easy-to-read signs—Informational and traffic signs are large, briefly and plainly worded for easy reading at turnpike speeds. They are reflectorized for maximum night legibility. So-called "cat's-eye" markers along the outer edge of both roadways will guide motorists at night and in bad weather.

• Enforce speed limit—The entire turnpike will be well policed to protect the turnpike patrons as well as to enforce traffic regulation. Speed limits have been set at 65 mph for pas-

(*Continued on page 72*)

Connecticut 'Pike

Alternate bids required on two types of pavement

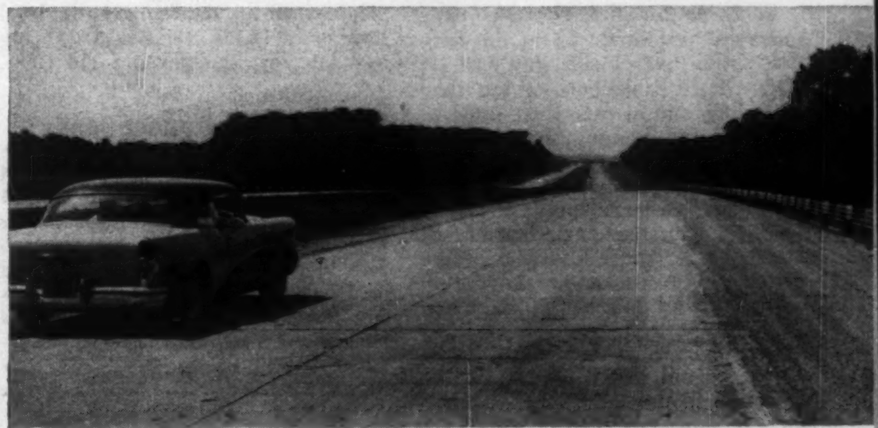
Connecticut's Highway Department has decided to take alternate bids on pavement for the Connecticut Turnpike, the 129-mi toll highway being built between Greenwich on the New York line and Killingly on the Rhode Island border. As designed originally, this highway was to be paved with portland-cement concrete. Now alternate bids on bituminous concrete are being taken.

As a result of this decision, bids on the Milford section of the turnpike that were to have been opened Sept. 12 were opened Sept. 26. All bidders were required to bid on both types of pavement.

(*Continued on page 72*)

For Safety, Ohio Turnpike Has:

- **Divided pavement with 56-ft median**
- **No intersections at grade**
- **Twin bridges at intersections**
- **Fencing along entire right-of-way**
- **Easy grades, gentle curves**
- **Paved shoulders inside and outside**



Rebman photo

. . . Ohio Turnpike

Continued from page 71

senger cars and 60 mph for commercial vehicles. Two-way radio will connect police and other turnpike vehicles, toll plazas, maintenance areas and the administration building. Service trucks will patrol the turnpike to aid distressed vehicles.

• **Service plazas**—Food, motor fuel and an opportunity to relax will be offered turnpike patrons at the 16 service plazas. Long accelerating and decelerating lanes will permit drivers to enter or leave the plazas and merge with turnpike traffic with comparative safety. In general, the plaza areas extend 1,200 ft along the turnpike and to a depth of 600 ft.

Each area will have a large building to house both the restaurant and gasoline service station. There also will be a small playground and garden, and a good sized picnic area. Each pair of service plazas will be served by a common water system and sewage system.

Restaurants will contain a dining room with 150 seating capacity, a coffee shop to serve about 50 and an outside snack bar.

In accordance with the no-monopoly policy of the Ohio Turnpike Commission the turnpike patrons will have a choice of restaurants operated by three restaurateurs, and of five well-known brands of gasoline. Restaurants and gasoline service stations will be open 24 hr per day.

• **Toll revenues**—If the earnings to date of the eastern 22-mi Eastgate Section are any criterion, the completed turnpike should more than pay its way under full operation. An estimated 39,000 vehicles are expected to use the turnpike daily during the next 12 months.

During the first 8 months of this year the Eastgate Section extending from the Ohio-Pennsylvania state line to State Route 18 west of Youngstown —collected $870,000 in tolls. Of this amount, $464,000 came from passenger cars and $406,000 from trucks.

• **Three years abuilding**—Ground was broken on Oct. 27, 1952 slightly less than three years before contract completion date for opening to traffic. In the early stages of construction, a number of skeptics believed that the target completion date of Oct. 1, 1955 could not be met (ENR Feb. 11, 1954, p. 32). But the combined efforts of the turnpike engineers and their general consultants; the 16 firms of contracting engineers who designed and handled the field engineering; 26 prime contractors; 300 subcontractors; an estimated 10,000 construction men; and perhaps the most gigantic assortment of roadbuilding equipment ever assembled—all resulted in construction being kept sufficiently on schedule to hit the target opening date of Oct. 1, 1955.

. . . Connecticut Bids

Continued from page 71

• **Types of pavement**—The Milford section of the Connecticut Turnpike is about three miles long and will have three lanes of pavement in each direction. Specifications for the portland-cement concrete pavement call for a 10-in. thickness on the outer lane in each direction, which will carry most of the truck traffic, and a 9-in. thickness on the other two lanes.

Subbases for the concrete pavement are as follows: 12 in. in earth cuts, 24 in. in rock cuts, and 6 in. on fills. On embankments of less than 10 ft high and in cuts, there must be 6 in. of free-draining, frost-resistant material below the subbase.

A uniform thickness of bituminous surfacing has been specified for all lanes. It is to be made up of a surface course of 3½ in. of bituminous concrete, a 3-in. course of penetration macadam, and a 4-in. base of broken stone. A subbase 11 in. thick is required in earth cuts and on fills, and 23 in. thick in rock cuts. A 6-in. subgrade of free draining material also must be provided.

Proponents of concrete objected, but unsuccessfully, to the alternate bid plan on the grounds that the two designs were not comparable with respect to load carrying capacity and were not competitive costwise.

Engineers of the Portland Cement Association stated that while the concrete designs to be bid on are suitable for single-axle loadings equal to or greater than the state's maximum legal limit of 22,400 lb—the 9-in. slab being adequate for 30,000lb and the 10-in. slab for 36,000-lb loads—the alternate bituminous section is only equivalent to Asphalt Institute requirements for 18,000-lb maximum axle loads. They also objected to the fact that the concrete design called for concrete curbs and bituminous concrete shoulders whereas penetration macadam shoulders and bituminous lip curbs were permitted for the asphalt alternate.

Highway Commissioner Newman E. Argraves has stated that final decision on the type of pavement to be put down will include more factors than price alone. These will include traffic and road conditions and the frequency of bridges with concrete decks. Where bridges are numerous, portland-cement concrete pavement probably will be laid between them.

Flood Repair Applications

Local governments in New York's flood disaster area have been given until Oct. 15 to apply to the Corps of Engineers for work or reimbursement for temporary repairs to public facilities. The Corps has been authorized to take care of all temporary repairs to public facilities such as bridges, streets and town highways. In addition, it will remove debris and clear stream channels that have been clogged or diverted as a result of the flood.

Flood Damage

North Carolina battered as Hurricane Ione takes heavy toll in six cities

Preliminary estimates of damage caused by Hurricane Ione, the third to hit North Carolina within a month, range up to $100 million, or as much damage as caused there by hurricanes Connie and Diane combined.

Highway damage fortunately was relatively low at $500,000, including roads and bridges as Ione flooded towns and cities, wrecked highways, battered and damaged buildings and tangled communications and utilities systems. The most seriously flooded towns were New Bern, Washington, Belhaven, Beaufort, Morehead City and Elizabeth City.

All the artificial sand barriers thrown up on many beaches after the disastrous Hurricane Hazel in 1954, took terrific poundings during Connie and Diane, but were lost in Ione.

At New Bern, waters from the Trent River swept over 40 square blocks, put business buildings and dwellings under three to four feet of water—loss, $12 million.

At Morehead City, water 5 ft deep broke a 15-ft high seawall.

Acting on a request of Governor Hodges, President Eisenhower declared North Carolina a disaster area for the third time in a month as a result of hurricanes.

Pavements were washed out, subgrades were softened, road shoulders were eroded, the North River bridge on US 70 east of Beaufort was cut as 10 spans went out, and long sections of the highway were left covered by water and sand. Hurricanes Connie, Diane and later heavy rains already have cost Highway Department an estimated $400,000 in repair bills.

Water Supply

Chicago studies 25-year $300-million expansion

A $300-million program to provide an adequate water supply for the Chicago metropolitan area has been submitted to city officials by the engineering firm of Alvord, Burdick and Howson, after a year's intensive study.

The ambitious program would be developed over a 25-year program. The plan contemplates the addition of 85 suburbs to the 51 communities now being supplied Lake Michigan water by Chicago.

Chicago's own water system also would be improved under the plan which recommends a 50% increase in water rates.

Four main transmission lines are recommended: one would run northwest through O'Hare Airfield, extending eventually to Barrington; a second would extend west to Glen Ellyn and Wheaton; a third would run southwest through Hinsdale to Downers Grove; and the fourth would supply Chicago Heights and Park Forest, south of Chicago.

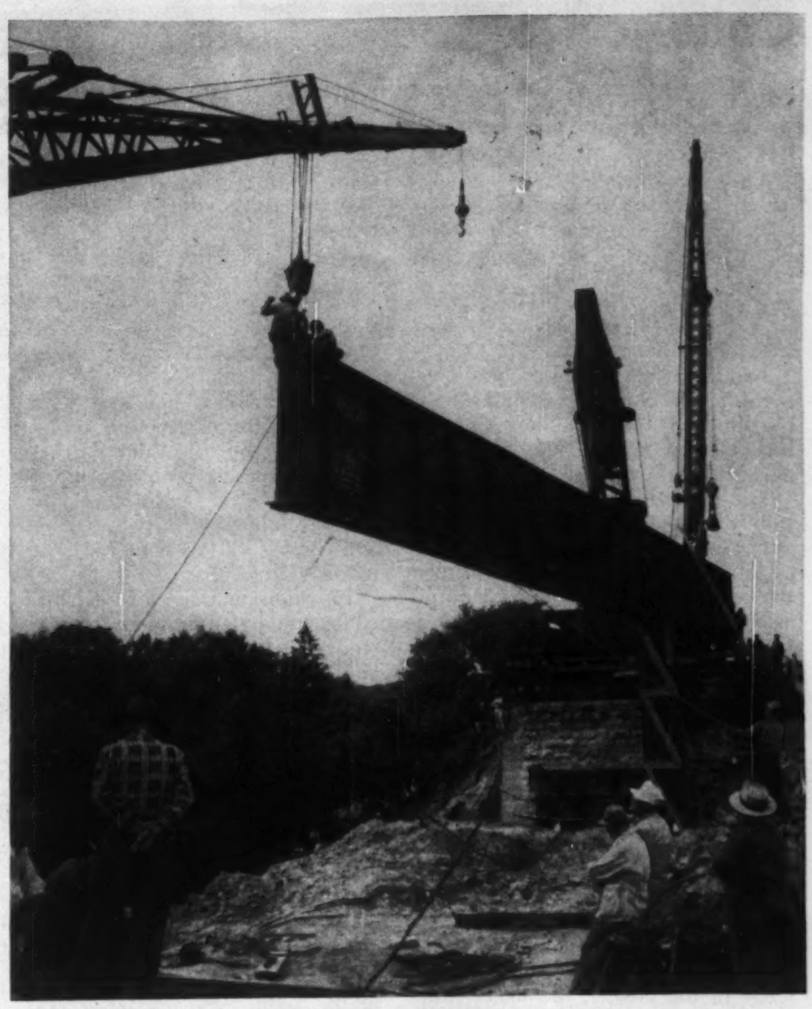
The report was submitted to James W. Jardine, Commissioner of Water and Sewers, for study and examination by city officials.

Court Says State Can Limit Traffic on an Access Road

In a precedent-making decision, the Washington State Supreme Court has ruled that the state has the right to limit the amount of traffic entering a freeway from an access road.

The high court decision overruled Cowlitz County Superior Court at Kelso. Earlier, the county court held that the state had no power to limit the use of lands back of the access since this would bar development of the property to take advantage of increased traffic on the main highway.

Previous court decisions have established that the state can limit access to freeways by designating the points where connecting roads may join the main thoroughfare. These rulings, however, were not concerned with limiting traffic on access roads.



Washed-Out Span Replaced in 8 Days

Within a space of just eight days, two 109-ft girders were fabricated and swung into place to restore a washed-out span on Erie Railroad's main line over Panther Creek at Shohola, Pa. The original 100-year-old stone arch disappeared late in August when Hurricane Diane's floods swept a wall of water down the Delaware gorge. American Bridge engineers, who were at the scene right after the disaster, decided that the old footings would serve to support a modern steel bridge. They drew up replacement plans, then sent verbal orders and specifications to U. S. Steel's Ambridge Plant. The fabrication of 50-ton girders normally would take months. But the plant got them off in record time to the site, where it took just 4½ hours to place them on existing "tee" abutments that had originally been built in 1878.

$92-Million Expressway Loop Approved for Memphis Area

A $92-million expressway plan for Memphis and Shelby County has been approved by the Memphis City Commission.

The project would run north-south and east-west, across Memphis, and loop around the present city limits. The proposed routes were recommended by Harland Bartholomew & Asociates, St. Louis planning firm, as a result of a study started last January.

The plan is designed to tie into the proposed federal interstate highway system, which would allot 68 mi of limited-access routes to the Memphis urban area.

Actual start of construction depends on adoption of the national highway plan by Congress and upon appropriation of funds. But the Tennessee Highway Department already has agreed to survey the proposed loop expressway, and federal-state money is available for purchasing right-of-way upon approval by the Federal Bureau of Public Roads.

Housing Project Contract

The $12.5-million general construction contract for erecting Morningside Gardens—a 1,000-family cooperative housing development for middle income groups in New York City—has been awarded to Joseph P. Blitz, Inc., New York general contractor.

The project is sponsored by nine religious, educational and medical institutions.

College Degree in Contracting

Committee of California builders spent two years planning construction management course now offered at UCLA

This fall—for the first time—a major in construction management is included in the curriculum of a leading U. S. university. The course, now under way at the University of California at Los Angeles, leads to a Bachelor of Science degree in business administration.

Inauguration of the new curriculum is the result of two years of planning on the part of the Building Contractors Association of California, in cooperation with the university.

For 10 years the National Association of Home Builders has had a policy of encouraging universities to establish training courses for prospective contractors. But the California association, largest NAHB affiliate, is the first member-group to launch a major, organized offensive in this direction.

The BCA began work on the program early in 1953 by forming an educational committee to work out the details and problems involved in proposing a construction management course. Because UCLA is located in the heart of one of the most rapidly-developing construction areas in the U. S., it was chosen as the place to start the program.

Once UCLA showed an active interest in the project, the major problem to be tackled was development of a course outline. In order to present the university with a clear picture of what was needed, the contractors first had to clarify among themselves what constituted an ideal contractor and what qualifications were most lacking in those entering the field.

• Too many specialists—They found that the chief weakness in the education background of most contractors is over-specialization. Because universities have not offered specific training for construction management, students interested in that goal are forced to take a major in architecture, engineering or real estate.

The most heated controversy arose over whether to use the engineering department as the core of the training—thus emphasizing the technical aspect of construction—or to draw chiefly on resources of the business administration department. The BCA committee decided that the contractor of today is essentially a businessman who needs just enough technical knowledge of building to deal intelligently with architects, subcontractors, and specialized technicians in the trade.

The curriculum, as worked out, includes general liberal arts subjects taken during the first two years. But the main emphasis is placed on basic business courses such as finance, accounting, selling, production methods and management problems; law, as it pertains to contracting problems; real estate courses dealing with such topics as housing problems, industrial location and regional development; and the influence of the government and private institutions on use of urban land.

In addition, an art department course in design is given to aid the student in dealing with the architect, and to help him understand the function of design in community planning as well as its effect on sales.

• Study costs—Engineering courses include basic structural engineering, surveying and the use of construction materials. In addition, two new courses have been added this fall for the benefit of construction management majors. They deal with construction procedures and equipment, and construction costs from the viewpoint of the contractor.

The BCA hasn't stopped its educational activities. It now has formed four new subcommittees that will continue to act in behalf of the construction management students.

One of the committees will work closely with UCLA faculty members on curriculum matters. A second will work toward incorporating research into the program. A third will be concerned with raising money from the building industry to set up a UCLA scholarship fund for construction management students. The fourth group will deal primarily with job placement.

Alcoa Building Will Feature New Gold-Mesh Wall Design

A new metal-skin building scheduled to go up in Atlanta to house the sales force of Aluminum Co. of America will feature a gold aluminum-mesh wall design.

The front and rear of the two-story building will be overlayed with a gold aluminum mesh set against a blue background of aluminum curtain wall facing. The mesh, a weave of extruded aluminum bars and channels will be composed of removable sections, suspended several inches from the structure's metal skin.

One end of the structure is to be partially faced with a marble pattern, while the other will be blue aluminum. The colors are applied by an electrochemical process in which they are actually impregnated into the surface of the metal. The colors reportedly will not chip, blister or rust.

The 102x61-ft sales center will provide 25 offices, two conference rooms and a number of accessory rooms for Alcoa's 75 district personnel. Both floors will employ central corridors, with windows providing outside lighting in all offices. The natural-finish aluminum windows, enclosed in mechanically operated frames, will pivot vertically for cleaning from the inside.

Architects for the Alcoa project are Schell, Deeter & Scott, Pittsburgh. General contractor is George A. Fuller Co., Atlanta, associated with Van Winkle & Co., also of Atlanta.

Two More Contracts Awarded For Lincoln Tunnel Project

Nearly three miles of continuous fluorescent lighting will be installed in the Lincoln Tunnel's third tube, now being built under the Hudson River, linking New York and New Jersey.

Contracts totaling some $2.3 million have been awarded by the Port of New York Authority for purchase and installation of the electrical equipment. These went to the joint venture of Lighting Electric Service Co., Newark, and Fischbach & Moore, Inc., New York City.

The contracts—the 40th and 41st for third-tube construction—bring to $62 million the total amount awarded since work began in September, 1952. When completed in 1957 the two-lane tube will increase the tunnel's annual capacity by 50%.

Atkinson Sues for $342,000 For Extra Work on Dam Job

Guy F. Atkinson Co. has filed suit against Santa Clara Valley, Calif., Water Conservation District for extra payments the company claims are due on the Lexington Dam project.

Atkinson was prime contractor on the project, located on Los Gatos Creek on the San Francisco peninsula.

Since the job was completed in 1952, the district has paid $1.7 million, the bid amount. But the construction firm asserts that the district owes some $342,000 more because of extra work done. The extra work, according to Atkinson, was necessary because plans were changed during construction, and because the district did not fulfill certain obligations.

Defense Project

Navy plans to construct three piers at Norfolk for use of aircraft carriers

With an eye on rapid construction schedules for its giant Forrestal Class aircraft carriers, the Navy is proceeding with planning for the first of the huge new piers at its Norfolk, Va., operating base.

Congress has authorized $9.8 million for the first of three piers planned. The Navy will ask additional funds for a total of about $28 million for the three structures planned.

Present plans call for piers about 1,300 ft long by 150 ft wide—dimensions that would put the structures among the world's largest of their type. (For comparison, New York City's Piers 88 and 90 which handle the superliners "Queen Mary," "United States" and others—are 1,100 ft long and 125 ft wide. Longest existing piers at Norfolk are 1,100 ft long, 80 ft wide.)

Design for the first pier has been divided into two parts: the pier itself and its shore facilities, by the New York City consulting firm of Praeger-Cavanaugh; designs for bulkhead, breakwater and necessary dredging will be handled by the design division of the Fifth Naval District Public Works Office at Norfolk.

Although no actual design is as yet under way, pending necessary studies, sources at Norfolk indicated that the structures may stand on concrete piles. The deck will carry railroad tracks and steam, fresh water, fuel, electric and telephone lines. At the landward end, the piers will be coupled with an asphalt taxi strip so carrier-based planes can be brought up to the ships under their own power for loading.

As a preliminary to pier construction, the Navy has started work on reclamation of 102 acres of land, with fill being supplied by dredges deepening channels in the Navy Yard area to a 45 ft average depth.

The structures will be protected by a 1,500 ft breakwater, and a long bulkhead will be installed to protect the reclaimed area.

Although the piers have already been popularly christened "Forrestal Piers," Navy sources emphasized that, while the structures were occasioned in part by the construction of the super-carriers, they will also meet a need for additional alongside mooring space for smaller capital ships.

Design and construction is under general direction of the Bureau of Yards and Docks, and under direct supervision of the Department of Public Works at the Naval Base, Norfolk.

Office-Garage Building Goes Up in a Jiffy

A spark of the arc and sheet-steel formwork and floor reinforcing are in place for the Parkade Building at Camden, N. J.

The 5-story office building which will provide parking space on its third, fourth and fifth floors, is being erected at an unusually rapid pace:

1. Excavation for the 150 x 500-ft structure, known as the Parkade Building, took only 29 days; 67,000 cu yd of earth were involved.

2. Steel erection of 3,500 tons was completed in 26 days by Bethlehem Steel Co., using high-tensile-strength bolts.

3. Up to 30,000 sq ft per day of corrugated-steel-sheet decking are being placed by 12 men for Fireproof Products Co., Inc., another subcontractor. The 13 x 12½-ft panels are both forms and reinforcing for the 4½-in.-thick concrete floors. The panels arrive at the site complete with temperature steel and are spot welded into place. Only negative steel over supports and electrical conduit are added before placing concrete.

Bill Harris is the superintendent for Terminal Construction Co., the general contractor. Architects for the combined office, store and elevated parking facility are Ziegler, Childs & Paulson, and the consulting engineer is Lars I. Moe & Son. Architect and engineer are Jersey City, N. J. firms. Dan LaMorte is superintendent for Fireproof Products Co., Inc.

Cowlitz Dams Controversy Reaches State Legislature

Washington's State Legislative Council has been asked to investigate spending of public funds by the State Fish and Game Departments in opposing construction of Tacoma's $134-million hydroelectric project on the Cowlitz River.

The departments have been seeking an injunction against the project on the grounds that a state law preserves the stream as a sanctuary (ENR Sept. 15, p. 23).

Tacoma's representatives in the state legislature have requested the investigation, contending that the two departments are wasting public funds. The city's utility director charges that the departments paid $75,000 plus expense-money—for the services of three assistant state attorney generals to argue just one phase of the legal maneuvering that has delayed the project in the courts. He estimates, in addition, that they spent approximately $20,000 in opposing the project before the Federal Power Commission.

Project plans call for one dam to be built at Mayfield, the other at Mossyrock. Tacoma already has awarded a contract for the Mayfield work, but actual construction is being held up by a restraining court-order granted the two departments.

Ohio River Under Discussion

The Ohio Valley Improvement Association will round out 60 years of Ohio River development at its annual meeting in Cincinnati Oct. 3 and 4. Three of the organization's standard topics—navigation locks and dams, flood control and conservation of water—will again come up for discussion. Two new subjects have been added: The Threat of Tolls on Inland Waterways, and War and Peacetime Uses of Atomic Energy.

Municipal Issues and Road Plans Give Massachusetts Legislators Hard Session

The Massachusetts legislature finally has ended its 1955 session, after prolonged bickering over Boston municipal problems and proposed new highway expenditures. However, the delayed adjournment enabled it to take prompt action on measures to finance reconstruction of public facilities damaged by the late August floods.

Gov. Christian A. Herter's proposed $125-million highway bond issue was killed by the Senate after it won House approval. Passage would have meant a record state budget of $550 million. As it is, the authorized $425 million worth of expenditures falls below that of the all-time high of $531 million, set in 1952.

Considerable debate centered on plans for two highly publicized Boston projects—the $75-million Back Bay business center (ENR Feb. 3, p. 28) and the $8.5-million garage beneath Boston Common (ENR April 21, p. 28).

The lawmakers set aside certain easements to permit construction of a tunnel from Boston Common to Commonwealth Ave. for access to the proposed underground garage. However, they sidetracked a measure to set up a seven-member public authority to build and operate the 2,400-car facility. Settlement of litigation on the parking project, expected shortly, will end eight years of ups and downs.

Tax deferment privileges on the proposed Back Bay Center were thrown out, thus holding up the gigantic undertaking and perhaps ruling it out altogether. Proposals for tax concessions were calculated to win financial support for the project, which would go up over the 28-acre yards of the Boston & Albany Railroad. Construction involves a $5-million convention and exhibition hall, a shopping center, a hotel, several office buildings, plus underground parking space for 5,000 cars.

Construction got a big boost from passage of a new building law designed to do away with some archaic restrictions. The code addition will permit use of state-approved new materials to reduce costs. A second bill sets up a new State Board of Schoolhouse Construction Standards in the Department of Public Safety to search for other means of shrinking building costs.

These are some of the other highlights of the state's legislative session:

• **Flood relief**—A $25-million bond issue was passed to finance state and local road and bridge repairs. A second issue—for $30 million—was authorized to pay for other repair work and to reimburse cities and towns for tax abatements granted on flood-damaged properties.

A $10-million bond issue was voted for a Metropolitan District Commission flood-control project and drainage in the Boston suburbs of Wakefield, Melrose, Stoneham, Everett and Revere. In addition, a flood control and land reclamation program along the Neponset River in Greater Boston was authorized with a $2-million bond issue.

• **Highways**—The Massachusetts Turnpike Authority has been authorized to extend the 123-mi east-west toll road into Boston. Its eastern terminus previously had been set near Boston at Route 128 in Weston.

•**Parking**—Boston was authorized to borrow another $10 million for off-street parking facilities. Several other cities—including Worcester and Springfield—also got the green light to borrow for this purpose.

• **Sewerage**—A $1-million bond issue was granted for extension of Boston's south metropolitan sewerage system to Framingham and Natick.

• **Tax relief**—Authority for cities and towns to borrow from the state against tax titles for ordinary maintenance and other purposes has been extended to July 1, 1957. This year Boston borrowed $3.5 million under this measure in order to hold down its 1955 tax rate.

• **Institutions**—Boston has been permitted to borrow $3 million for repairs to hospitals.

A $30.9-million bond issue was voted to finance construction at state teachers colleges and the University of Massachusetts, as well as at correctional, mental and public health units.

• **Recreation**—Expansion of recreational facilities was pushed by passage of a $2.6-million bond issue for state purchase and development of Horsneck Beach in Westport; a $750,000 issue for development of Scusset Beach at the mouth of Cape Cod Canal; and a $1.5-milion issue for development at Lake Quinsigamond in Worcester.

Jacksonville vs Turnpike Route Report

Engineers' recommendations that the proposed state-long Florida Turnpike by-pass Jacksonville at its northern terminus have raised a storm of protest from local interests.

The highways committee of Jacksonville's Chamber of Commerce and South Side Business Men's Club has suggested that the $200-million turnpike tie into U. S. Highway 1 at a point about 12 mi south of the city.

The northern end of the route, as finally recommended by Howard, Needles, Tammen & Bergendoff, New York City consulting engineers, would lie about 6½ mi west of Jacksonville, and furnish feeder lines into the city. Originally, the route was slated to run 16 mi to the west of Jacksonville, but it was brought in 10 mi as a result of protests (ENR March 10, p. 23).

The conflict between engineering recommendations and local interests has raised a question. Would the prime objective of the toll road—to get people where they are going in the quickest possible time—be thwarted if traffic were funneled through the city instead of avoiding it?

At the turnpike's southern end, where work is now in progress between Ft. Pierce and Dade County, the route will take traffic into the Miami area. But there the primary purpose is to get tourists to south Florida as quickly as possible. Oddly enough, when the original route of the southern end was laid out too close to West Palm Beach, local interests protested that it would choke off western expansion.

The protests of Jacksonville interests against the by-pass route have been laid before Gov. Leroy Collins. He has stated that he is in strong sympathy with efforts to protect and improve investments in Florida. But he adds that the state is heading for trouble if any consideration other than sound engineering advice determines the location. "There is even some danger that locating the northern terminus of the turnpike south of Jacksonville would overload the expressway system from the moment of its completion. Thus no real progress would be made in solving Florida's overall highway problems."

Special Safety Session

Michigan's Gov. G. Mennen Williams has announced plans to call a special session of the state legislature to consider the problem of highway safety.

The session, which is expected to be held late in October or early in November, will consider a safety program designed to reduce the state's increasing highway death toll.

On Second Thought . . .

New York May Scrap Passenger Belt Plan

New York City's long-discussed plan to substitute a passenger belt-conveyor for the 37-year-old shuttle train between Times Square and Grand Central Station appears doomed.

Transit Authority heads now are questioning whether the mechanism is economically sound or necessary at this time. They believe that the existing shuttle—opened in 1918—is rendering good service and could be improved for considerably less than the $4.1 million it would cost to put in the belt.

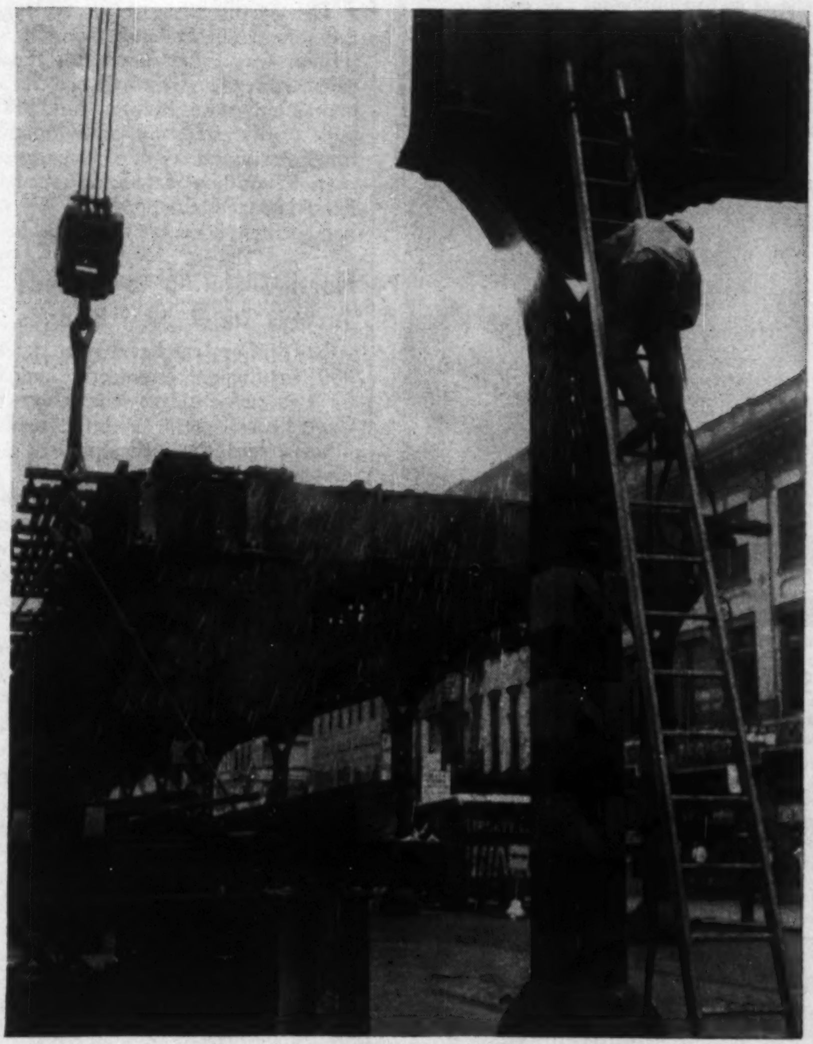
In addition, the City Comptroller terms the project an expensive experiment involving high maintenance charges. And his engineering staff reportedly raised the question of safety during its investigation of the belt system.

The Board of Estimate will defer action on the project until its regular meeting, scheduled for Oct. 20. At that time the proposal will be restudied in regard to operations and costs. Meanwhile, transit officials are considering a new plan to extend and improve the present Times Square platform. This plan would include elimination of curves and possible extension of the track beyond Grand Central.

The moving-belt scheme was inherited by the new Transit Authority when it took over from the old five-man board last July. As planned, the shuttle conveyor would consist of an endless chain of 10-passenger cars resting on moving rubber belts. (ENR June 3, 1954, p. 26). The cars would move along the platform at 1½ mph to permit passengers to step on and off. The cars would speed up to 15 mph after leaving the station, then slow down again upon arrival at the other terminus.

The conveyor was first proposed as a shuttle replacement in 1952 by the old Board of Transportation. The Board of Estimate was asked for $3.8 million to build and install a moving platform to carry 15,000 passengers an hour. That sum was included in the capital budgets for 1953 and 1954, but the plan also called for an additional $1.1 million to reconstruct the shuttle tunnel.

Last November the old authority awarded a $3.8-million contract for furnishing and installing the equipment to Passenger Belt Conveyors, Inc., of Akron, Ohio, a subsidiary of Stephens-Adamson Manufacturing Co., Aurora, Ill., (ENR Nov. 11, 1954, p. 27). This agreement, however, never received the required approval of the Board of Estimate.



The Old Third Avenue El Bows Out

After 70 years of service, New York's Third Avenue El is being demolished as part of a city modernization program. The structure, which will yield 35,000 tons of scrap steel, is being cut down and shipped 90 mi by barge and rail to the Bethlehem, Pa., plant of Bethlehem Steel Co. Lipsett, Inc., New York City contractors, is expected to take nearly a year to complete the demolition job.

Florida Airbase Expansion

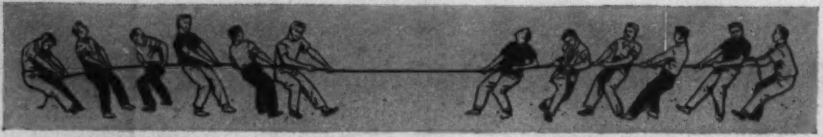
Cecil Field Naval Air Station, southwest of Jacksonville, Fla., is slated for a $12-million expansion program followed by an additional $10-million program during fiscal year 1957.

Among the improvements will be a new 8,000-ft runway, a theater, the first unit of bachelors' quarters and 90 housing units. Also included will be a Miramar-type hangar, high-speed fueling facilities, a parachute loft, recreation fields and new supply warehouses.

Goal: Four Cumberland Dams

An all-out fight for construction of four dams on the Upper Cumberland River has been pledged by a newly-formed group of business leaders from six Upper Cumberland counties. The organization—Upper Cumberland Development Association—has as its goal construction of one power and flood control dam on Laurel River, one on Rockcastle River, and two on Big South Fork River just over the Kentucky line in Tennessee.

Col. Gilbert M. Dorland, Nashville District Engineers, had estimated that the total cost of the four projects would exceed $100 million.

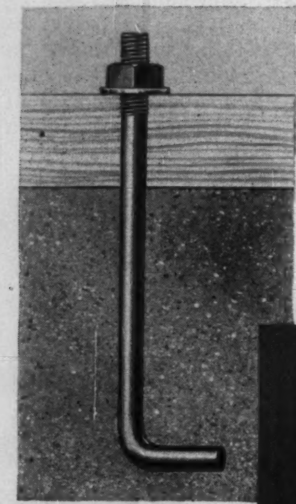


ANCHOR "MEN"

OF THE *Lamson* LINE...

Because every fastener is designed to do a specific holding job, it takes a rugged fastener when the going's rough.

Here are the "brutes" of the Lamson Line, backed by 89 years of experience and proven in use under the most rugged conditions.



LAMSON ANCHOR BOLTS

For fastening wood to concrete. Made from mild carbon steel with a right angle bend which acts as an "anchor hook".

These anchor bolts are now required in many building codes and are made to meet such specifications.

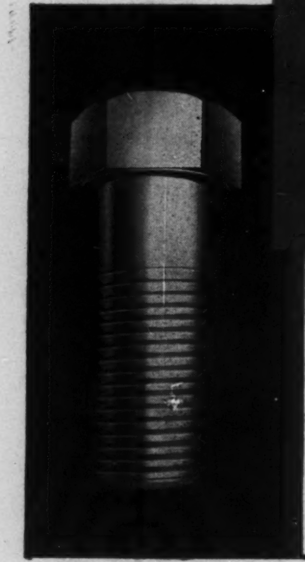
There is a 2" hook at one end and a 2" thread at the other. Sizes range from 6 to 20 inches in length and in two diameters—⅜" and ½". Furnished with washer and square nut.

BULLDOG WIRE ROPE CLIPS

Made with U-Bolts of high quality steel, accurately threaded for close fit with forged hexagon nuts.

The secret of their non-slip grip is in the construction of the saddle (Certified Malleable Iron of Approved Quality) . . . the wire rope lays smoothly in tailor made grooves that grip in the center and don't cut or bite at the edges.

The entire assembly is plated to withstand a 40 hr. salt spray test. The Lamson Wire Rope Clip comes in a wide range of sizes (3/16" to 1½" clips) . . . one for most every holding job.



LAMSON 1035 CAP SCREWS

The real "workhorse" of the construction and heavy equipment field. Available in sizes from 3/16" x ½" to 1½" x 12" and fine or coarse threads. After years in the field, Lamson 1035, High Carbon, Heat Treated Cap Screws are proving to be one of the most versatile fasteners available.

Lamson + Sessions

The LAMSON & SESSIONS *Co.*
1971 West 85th Street • Cleveland 2, Ohio
Plants at Cleveland and Kent, Ohio
Birmingham • Chicago

Large Bolts • Cotters
Square and Hex Nuts • Weather-tight Bolts • Bent Bolts
Phillips and Clutch Head Screws • Lock Nuts • Cap Screws

Pennsylvania Hikes Taxes To Repair Flood Damages

Pennsylvania's Gov. George M. Leader has signed bills calling for a one-cent increase in gasoline and cigarette taxes to finance flood-damage reconstruction.

The added gasoline tax, which became effective Sept. 13 for two years, is expected to bring in $54 million. The new cigarette levy, scheduled to start Oct. 1 for 20 months, will provide an estimated $20 million.

The 6-cent gas tax will give the Pennsylvania Highways Department $30 million for repairs to state highways and bridges. Local governments will get $15 million for road and bridge reconstruction. The remaining $9 million is slated for other local subdivisions for increased state highway aid.

The 5-cent cigarette tax will give the state Civil Defense Council $12 million for distribution to state departments. The rest will go into a permanent state disaster fund. The bulk of the $12 million will go to the Forests and Waters Department, with $3 million slated for repairs to flood-damaged channels and $7 million for new flood control projects.

North Carolina to Finance Surveys for 2 New Bridges

North Carolina has allocated $40,000 to finance engineering surveys for two new bridges—one across the Cape Fear River at Wilmington, the other across the Alligator River on the northeast coast.

The Wilmington bridge, which is the largest new project currently under consideration for the highway system, would cost at least $12 million (ENR, Sept. 15, p. 27). It would connect U. S. Highways 17 and 74 in Brunswick County with Dawson St. in Wilmington. Present plans call for a 5,500-ft-long span with a 600-ft horizontal and a 155-ft vertical navigation clearance.

The Alligator River bridge, to cost about $3 million, would carry U. S. Highway 64 from the Sandy Point area in Tyrrell County to the East Lake section in Dare County.

Norfolk Hails Progress In Fight Against Slums

Norfolk's Board of Minimum Housing Standards—formed in 1951 to prevent slums from developing—has cited a high rate of cooperation from property owners in compliance with the city's code of minimum standards.

The board, which has just issued its first report, announces that from

January, 1954, to August, 1955, 804 dwelling units were rehabilitated; approximately 702 units were in various stages of repair as a result of notices; and 35 full blocks had been surveyed and 17 blocks rehabilitated.

Enforcement of the code is under the direction of the Norfolk Department of Public Health. The board exists as an appeals body, and during the year and a half of its full operation has had to sit in that capacity only once.

Kaiser Pursues Approval To Build Dam in Canada

Despite Canadian legislative barriers, Kaiser Aluminum & Chemical Corp. still wants to go ahead with plans to build a $25-million Arrow Lake storage dam on the Columbia River in British Columbia (ENR Oct. 14, 1954, p. 24).

One of the firm's first steps will be to file an application with the Canadian federal government for a permit to export water to feed its generators in Bonneville, Wash. Under the international rivers bill passed in the House of Commons earlier this year, such a permit must be obtained before water resources may be exported.

British Columbia, which endorses the project, was overruled by the federal government on this issue. If the Kaiser permit is not granted, British Columbia may challenge the federal government's right to interfere in what the provincial government maintains is a local affair. Meanwhile, the province has gone ahead and approved an eight-month extension for Kaiser to complete surveys.

Two New Edmonton Bridges —Answer to Traffic Jams

Construction of a new four-lane bridge has been approved by Edmonton, Alberta, as the answer to traffic jams across the North Saskatchewan River.

The long-discussed project, to be located upstream from the present 105th St. bridge crossing, is expected to cost approximately $3.3 million. Edmonton's next step will be to pass a law enabling it to borrow the necessary money. This measure then will be submitted for approval to the Alberta Public Utility Commission and placed before city voters.

A second new bridge across the North Saskatchewan is scheduled as part of an Alberta plan to build ring roads around Edmonton. The provincial program, expected to get under way next year, calls for construction of a crossing in the vicinity of 142nd St.

In Hazardous or Coded Areas Specify RESOLITE FIRE-SNUF The Fiberglass Panels With Flame Spread Rating Below 75*

In buildings where fire hazards are severe or where codes require a flame spread rating below 75, you can now specify Resolite Fire-Snuf fiberglass-reinforced, translucent panels for plant daylighting.

Fire-Snuf panels are self-extinguishing—they will not, of their own accord, support combustion. Under the fire of a blow-torch (see below) they will burn, but they extinguish themselves almost immediately upon removal of the source of heat and flame. *Their flame spread rating of below 75 places them in a bracket equivalent to the Building Officials Conference of America classification of "slow burning" or "flame retardant."

FIRE-SNUF Blow-Torch Test

A blow-torch applied directly to edge of a Fire-Snuf panel slowly ignites resin and small flames appear. The blow-torch is turned aside and five seconds later (note stop watch) flames on the panel are self extinguished.

Fire-Snuf panels are not designed to replace standard Resolite, but, rather, to supplement it in critical areas. With permanent flame resistance chemically locked in, they retain all the best features of standard Resolite—shatterproof safety, strength, translucence, stability and load bearing characteristics.

Available at extra cost, Fire-Snuf is molded in flat panes for glazing and in all standard Resolite corrugations in lengths up to 13 feet and widths up to 42 inches. For additional information consult your distributor or contact . . .

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Office and Warehouse, CHICAGO, ILL.
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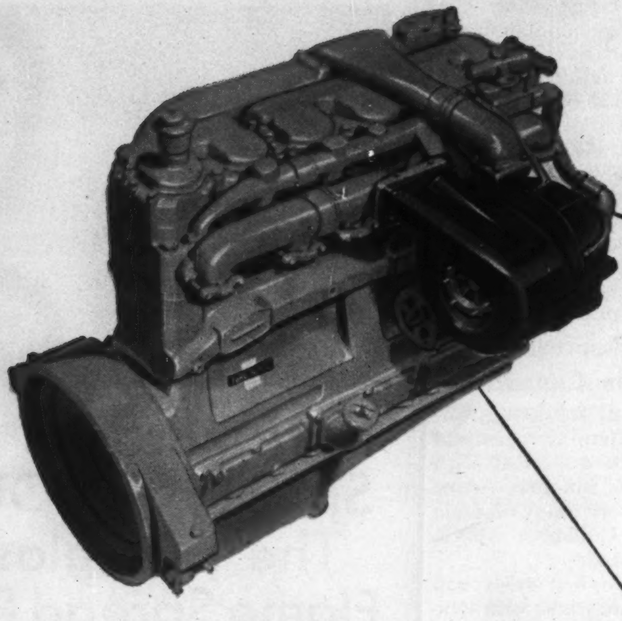
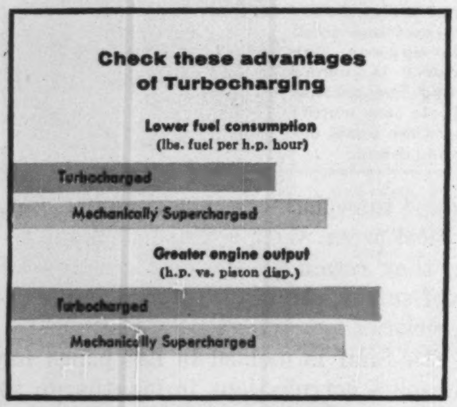


Cummins Turbodiesels.

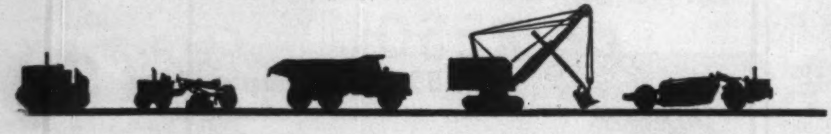


Five new Cummins Turbodiesels (175 . . . 250 . . . 262 . . . 300 . . . . and 600 h.p.) now feature the sensational new development in Diesel engineering—exhaust gas turbocharging!

They give you more economy . . . more performance than naturally aspirated or mechanically supercharged engines. Exhaust gas energy normally wasted is harnessed to achieve a more perfect air-fuel mixture in the combustion chamber, without any parasitic load. (See diagram at right.)

If you want drastically reduced fuel costs . . . longer engine life . . . lowest possible weight per horsepower . . . and maximum profits . . . get full details on Cummins Turbodiesels from your nearest Cummins Distributor.

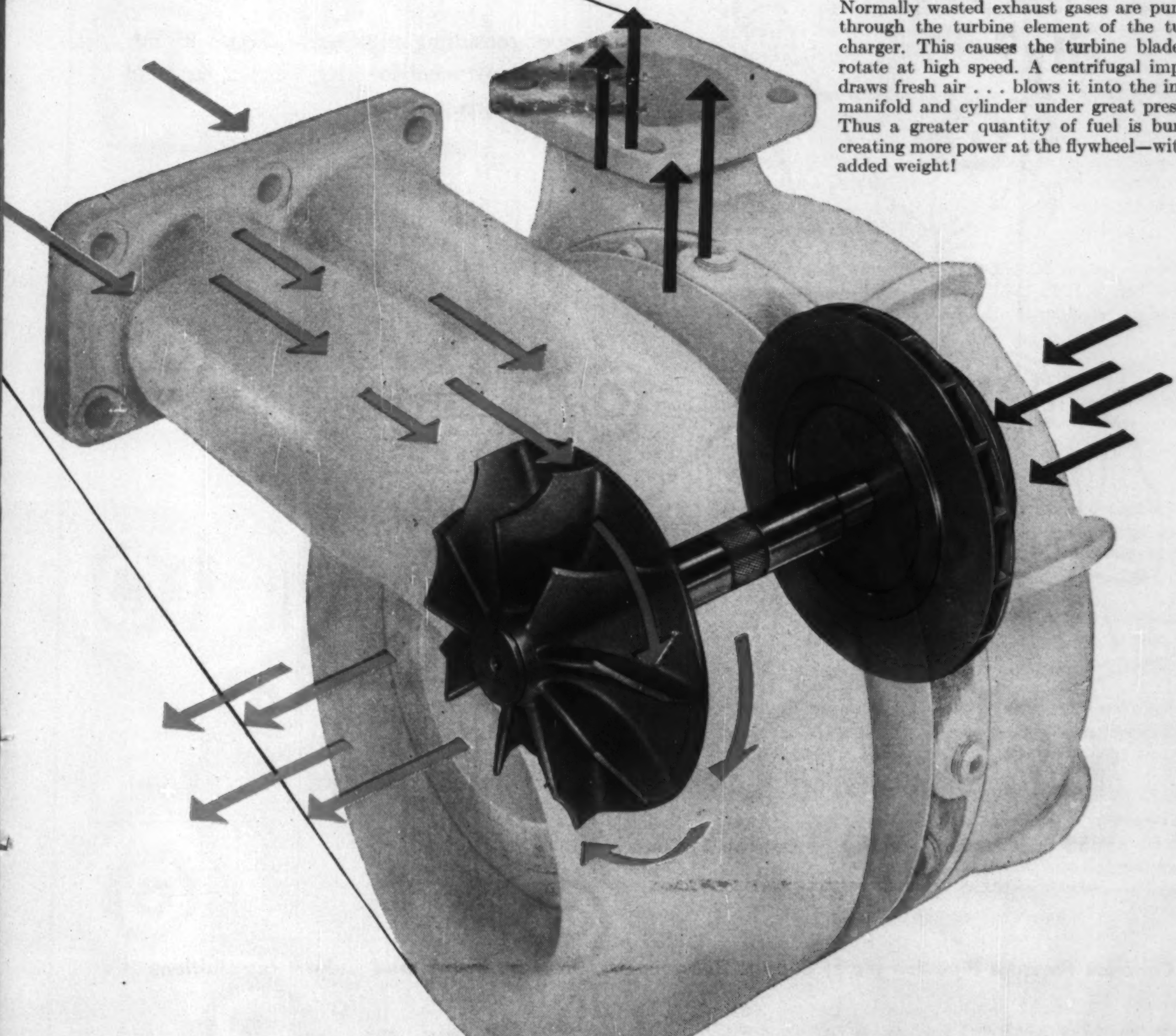
Cummins Diesels are available in the equipment of over 40 leading manufacturers.



CUMMINS

Cummins Engine Company, Inc. • Columbus, Indiana

. . put waste heat to work!



flow of exhaust gases

← flow of intake air

Cummins Turbocharging — how it works. Normally wasted exhaust gases are pumped through the turbine element of the turbocharger. This causes the turbine blades to rotate at high speed. A centrifugal impeller draws fresh air . . . blows it into the intake manifold and cylinder under great pressure. Thus a greater quantity of fuel is burned, creating more power at the flywheel—with no added weight!

Salem got the "Big 3" Will your city?

Out here in Ohio, Salem wanted a 20-inch supply line that would *last a 100 years or more,* be *strong enough to be virtually shatter-proof,* and give them *sustained high carrying capacity.*

They picked Price Pipe, because it gave them *every one* of the "Big 3": *long life, great strength* and *sustained capacity.*

Rochester, N. Y. picked Price Pipe for the same reasons. So did Dayton, Ohio, Saginaw, Michigan and many more.

Will your new water line meet all three requirements?

If you want the best pipe today's engineers can design, specify Prestressed Concrete Steel-Cylinder Pipe.

Tell your consulting engineer to check with our engineering department for sizes, weights, tests and laying information.

Price Brothers Company

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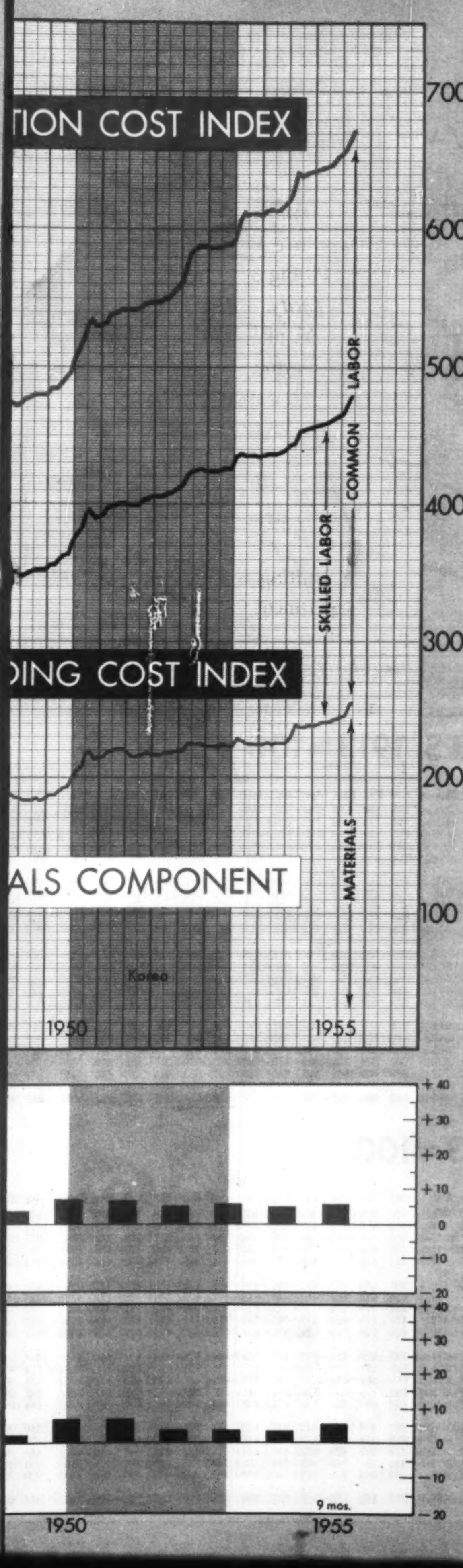
MEMBER AMERICAN CONCRETE PRESSURE PIPE ASSOCIATION

Concrete Pressure Pipe for Water Supply, Subaqueous, Pressure Sewer and Culvert Installations



ENGINEERING NEWS-RECORD
CONSTRUCTION AND BUILDING COST INDEXES

THE ENGINEERING NEWS-RECORD Construction Cost Index was established in 1921, based on price movements in structural steel, portland cement, lumber and common labor. The Building Cost Index was introduced in 1938 to measure also the effect of skilled wage trends on costs. It uses the same materials as those in the construction cost index but skilled labor, instead of common labor.

A few minor changes have been made in these indexes over the years necessitated by changed conditions in the market. These are recorded in full in ENR, September 1, 1949, page 398, together with a complete history of the development and use of these indexes. New values originally reported monthly at the beginning of each month have also been reported each week beginning July, 1954.

Both indexes are based on 1913=100 but are reported also each week on 1926=100 and 1949=100 bases. These are weighted aggregative indexes, thus base years can be shifted at will.

ENR Construction and Building Cost Indexes reflect wage rate and material price trends. They do not adjust for labor or job efficiency, materials availability, competitive conditions, management, mechanization or other "intangibles" affecting construction costs.

- **A hypothetical block of construction** requiring 6 bbls of cement, 1.088 M ft bm of lumber, 2,500 lbs of steel and 200 hrs of common labor is used in the **Construction Cost Index** to measure the trend of the cost of heavy construction.
- **A similar hypothetical block of construction** using the same quantities of materials, but 68.38 hrs of skilled labor is the basis for computing the **Building Cost Index.**

This simple structure was adopted to facilitate prompt reporting of changes due to price and wage rate movements, both as to direction and degree.

Both indexes have proved, over the years, infallible as to direction and, in normal times, accurate as to degree. Under abnormal conditions of increasing or decreasing job productivity, allowance for the "intangibles" listed above should be made in measuring the degree of change in overall completion costs, or in construction selling price trends.

Supplement to Engineering News-Record, September 29, 1955. Business News Department, Engineering News-Record, 330 West 42nd Street, New York 36, N. Y. Reprints are available at fifty cents each.

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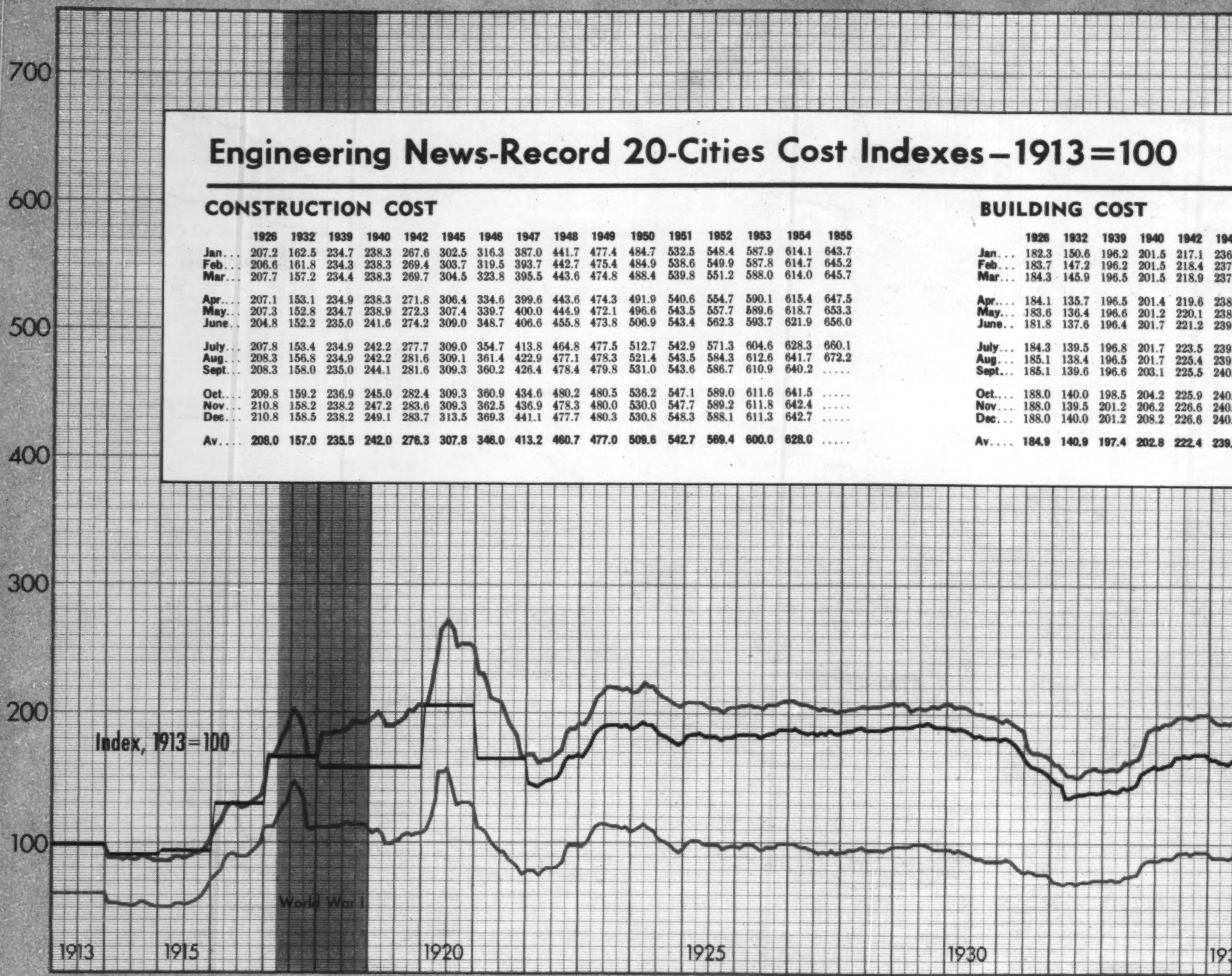


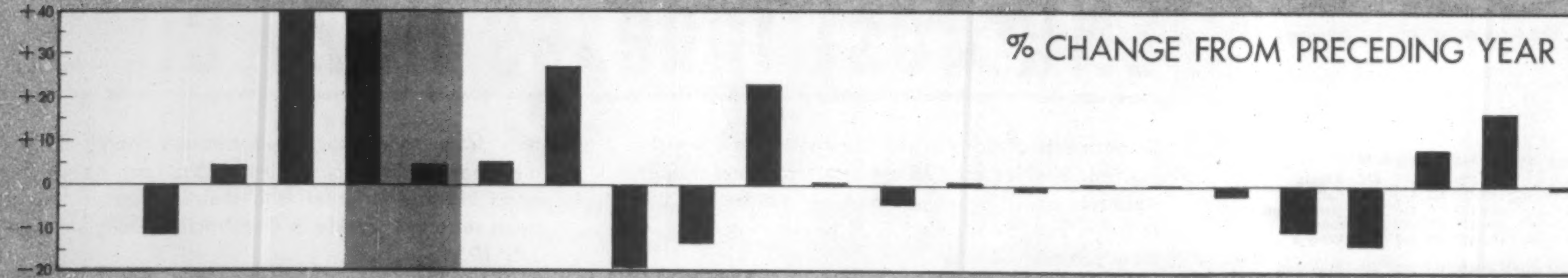
Engineering News-Record 20-Cities Cost Indexes—1913=100

CONSTRUCTION COST

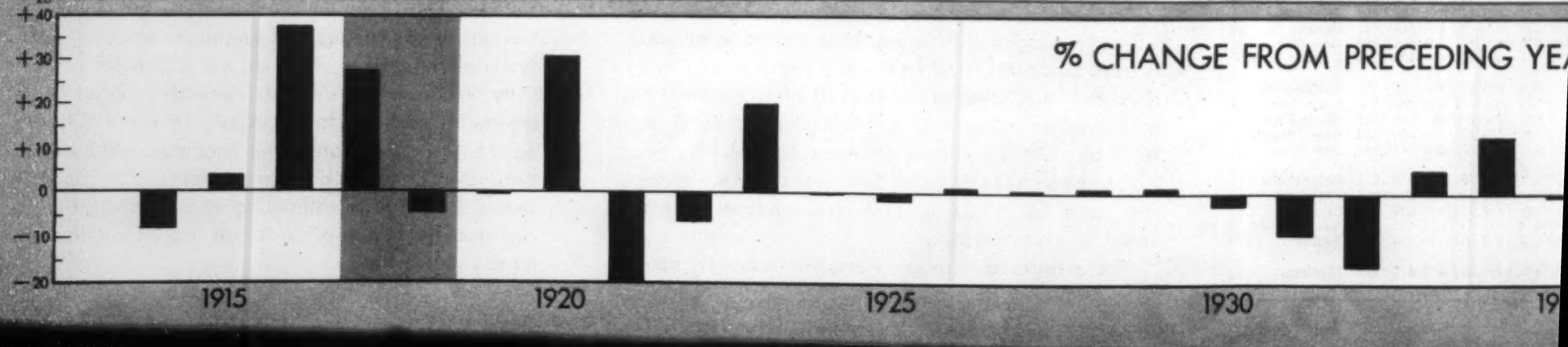
	1926	1932	1939	1940	1942	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Jan...	207.2	162.5	234.7	238.3	267.6	302.5	316.3	387.0	441.7	477.4	484.7	532.5	548.4	587.9	614.1	643.7
Feb...	206.6	161.8	234.3	238.3	269.4	303.7	319.5	393.7	442.7	475.4	484.9	538.6	549.9	587.8	614.7	645.2
Mar...	207.7	157.2	234.4	238.3	269.7	304.5	323.8	395.5	443.6	474.8	488.4	539.8	551.2	588.0	614.0	645.7
Apr....	207.1	153.1	234.9	238.3	271.8	306.4	334.6	399.6	443.6	474.3	491.9	540.6	554.7	590.1	615.4	647.5
May...	207.3	152.8	234.7	238.9	272.3	307.4	339.7	400.0	444.9	472.1	496.6	543.5	557.7	589.6	618.7	653.3
June..	204.8	152.2	235.0	241.6	274.2	309.0	348.7	406.6	455.8	473.8	506.9	543.4	562.3	593.7	621.9	656.0
July...	207.8	153.4	234.9	242.2	277.7	309.0	354.7	413.8	464.8	477.5	512.7	542.9	571.3	604.6	628.3	660.1
Aug...	208.3	156.8	234.9	242.2	281.6	309.1	361.4	422.9	477.1	478.3	521.4	543.5	584.3	612.6	641.7	672.2
Sept...	208.3	158.0	235.0	244.1	281.6	309.3	360.2	426.4	478.4	479.8	531.0	543.6	586.7	610.9	640.2	.....
Oct....	209.8	159.2	236.9	245.0	282.4	309.3	360.9	434.6	480.2	480.5	536.2	547.1	589.0	611.6	641.5	.....
Nov...	210.8	158.2	238.2	247.2	283.6	309.3	362.5	436.9	478.3	480.0	530.0	547.7	589.2	611.8	642.4	.....
Dec...	210.8	158.5	238.2	249.1	283.7	313.5	369.3	441.1	477.7	480.3	530.8	548.3	588.1	611.3	642.7	.....
Av....	**208.0**	**157.0**	**235.5**	**242.0**	**276.3**	**307.8**	**346.0**	**413.2**	**460.7**	**477.0**	**509.6**	**542.7**	**569.4**	**600.0**	**628.0**	.....

BUILDING COST

	1926	1932	1939	1940	1942	194
Jan...	182.3	150.6	196.2	201.5	217.1	236
Feb...	183.7	147.2	196.2	201.5	218.4	237
Mar...	184.3	145.9	196.5	201.5	218.9	237
Apr....	184.1	135.7	196.5	201.4	219.6	238
May...	183.6	136.4	196.6	201.2	220.1	238
June..	181.8	137.6	196.4	201.7	221.2	239
July...	184.3	139.5	196.8	201.7	223.5	239
Aug...	185.1	138.4	196.5	201.7	225.4	239
Sept...	185.1	139.6	196.6	203.1	225.5	240
Oct....	188.0	140.0	198.5	204.2	225.9	240
Nov...	188.0	139.5	201.2	206.2	226.6	240
Dec...	188.0	140.0	201.2	208.2	226.6	240
Av....	**184.9**	**140.9**	**197.4**	**202.8**	**222.4**	**239**



% CHANGE FROM PRECEDING YEAR



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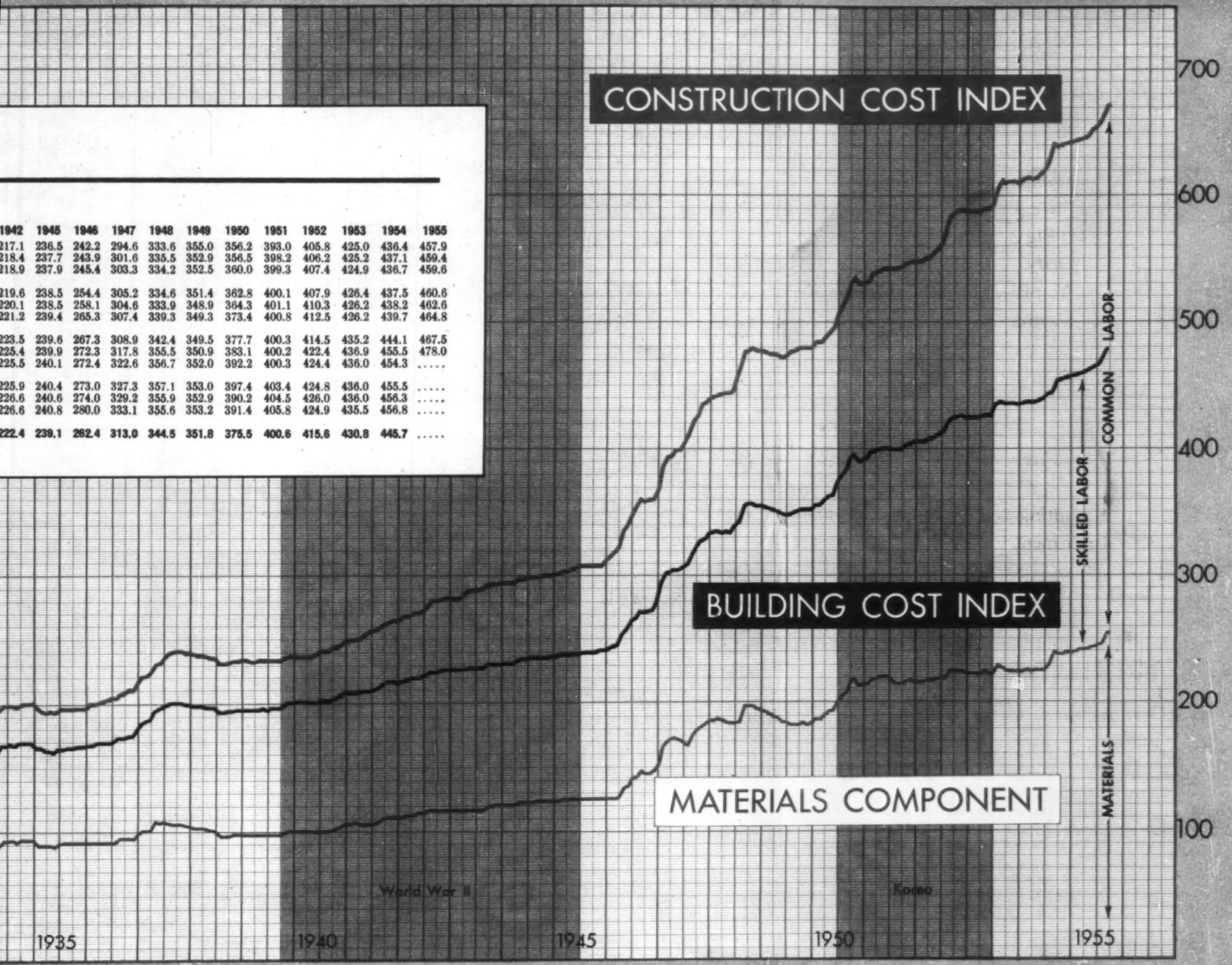
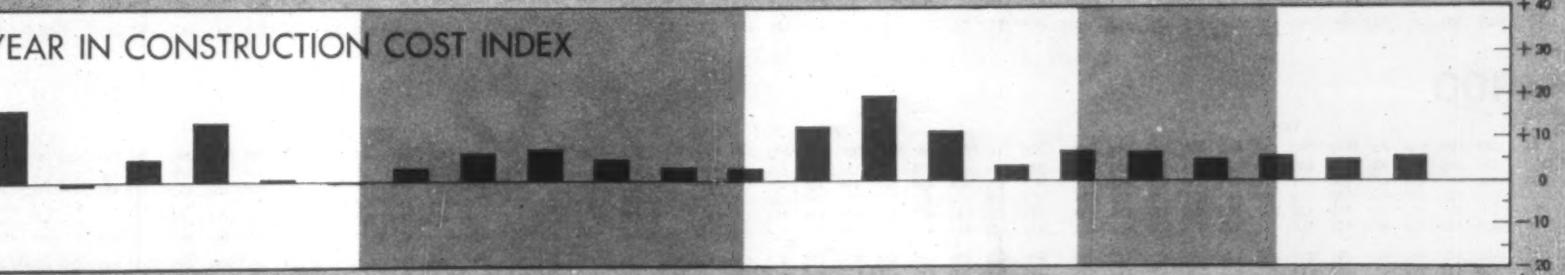
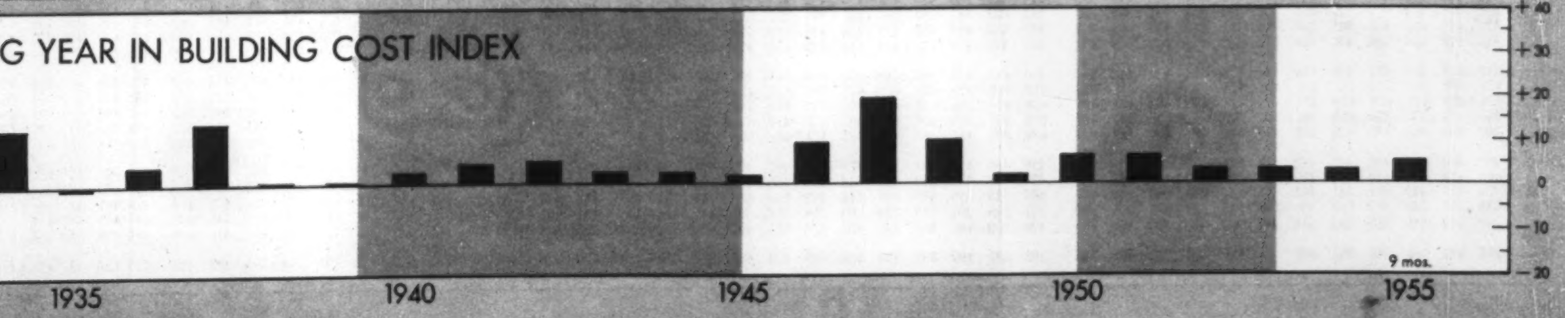


1942	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
217.1	236.5	242.2	294.6	333.6	355.0	356.2	393.0	405.8	425.0	436.4	457.9
218.4	237.7	243.9	301.6	335.5	352.9	356.5	398.2	406.2	425.2	437.1	459.4
218.9	237.9	245.4	303.3	334.2	352.5	360.0	399.3	407.4	424.9	436.7	459.6
219.6	238.5	254.4	305.2	334.6	351.4	362.8	400.1	407.9	426.4	437.5	460.6
220.1	238.5	258.1	304.6	333.9	348.9	364.3	401.1	410.3	426.2	438.2	462.6
221.2	239.4	265.3	307.4	339.3	349.3	373.4	400.8	412.5	426.2	439.7	464.8
223.5	239.6	267.3	308.9	342.4	349.5	377.7	400.3	414.5	435.2	444.1	467.5
225.4	239.9	272.3	317.8	355.5	350.9	383.1	400.2	422.4	436.9	455.5	478.0
225.5	240.1	272.4	322.6	356.7	352.0	392.2	400.3	424.4	436.0	454.3	.....
225.9	240.4	273.0	327.3	357.1	353.0	397.4	403.4	424.8	436.0	455.5	.....
226.6	240.6	274.0	329.2	355.9	352.9	390.2	404.5	426.0	436.0	456.3	.....
226.6	240.8	280.0	333.1	355.6	353.2	391.4	405.8	424.9	435.5	456.8	.....
222.4	**239.1**	**262.4**	**313.0**	**344.5**	**351.8**	**375.5**	**400.6**	**415.6**	**430.8**	**445.7**	.....


YEAR IN CONSTRUCTION COST INDEX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These are recorded in
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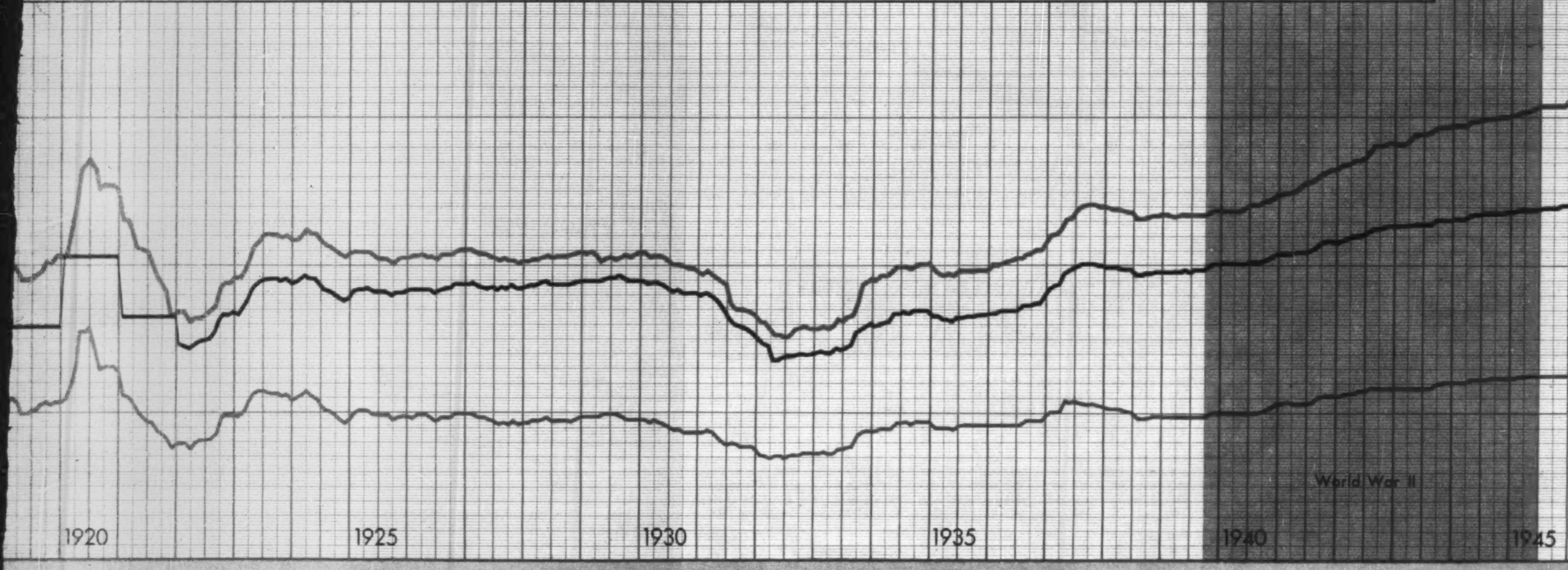
News-Record 20-Cities Cost Indexes—1913=100

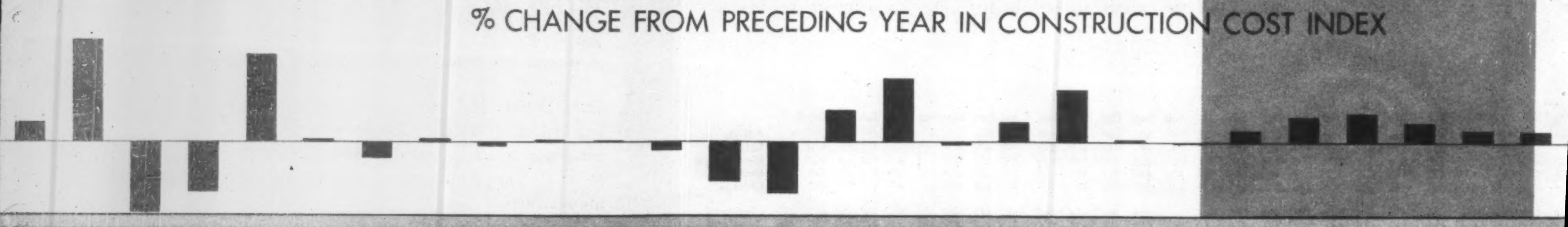
OST

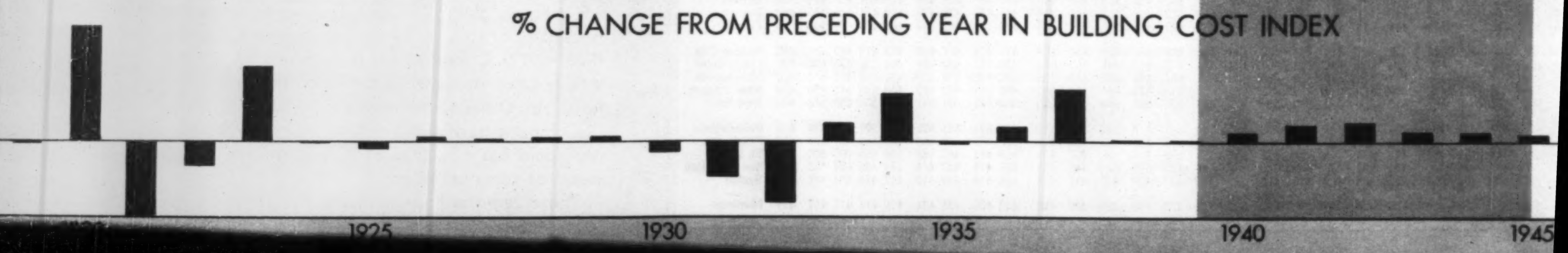
	1942	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
	267.6	302.5	316.3	387.0	441.7	477.4	484.7	532.5	548.4	587.9	614.1	643.7
	269.4	303.7	319.5	393.7	442.7	475.4	484.9	538.6	549.9	587.8	614.7	645.2
	269.7	304.5	323.8	395.5	443.6	474.8	488.4	539.8	551.2	588.0	614.0	645.7
	271.8	306.4	334.6	399.6	443.6	474.3	491.9	540.6	554.7	590.1	615.4	647.5
	272.3	307.4	339.7	400.0	444.9	472.1	496.6	543.5	557.7	589.6	618.7	653.3
	274.2	309.0	348.7	406.6	455.8	473.8	506.9	543.4	562.3	593.7	621.9	656.0
	277.7	309.0	354.7	413.8	464.8	477.5	512.7	542.9	571.3	604.6	628.3	660.1
	281.6	309.1	361.4	422.9	477.1	478.3	521.4	543.5	584.3	612.6	641.7	672.2
	281.6	309.3	360.2	426.4	478.4	479.8	531.0	543.6	586.7	610.9	640.2	.....
	282.4	309.3	360.9	434.6	480.2	480.5	536.2	547.1	589.0	611.6	641.5	.....
	283.6	309.3	362.5	436.9	478.3	480.0	530.0	547.7	589.2	611.8	642.4	.....
	283.7	313.5	369.3	441.1	477.7	480.3	530.8	548.3	588.1	611.3	642.7	.....
	276.3	**307.8**	**346.0**	**413.2**	**460.7**	**477.0**	**509.6**	**542.7**	**569.4**	**600.0**	**628.0**	.....

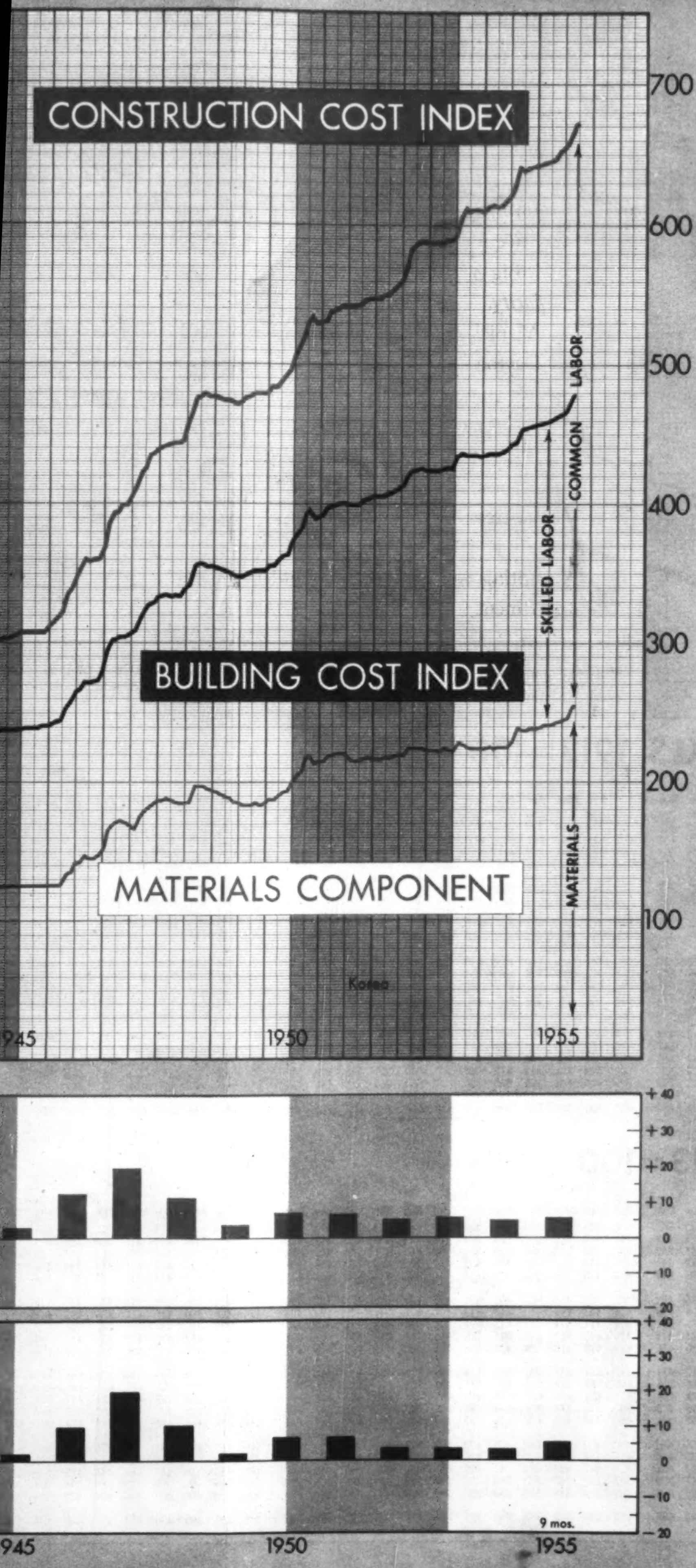
BUILDING COST

	1926	1932	1939	1940	1942	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Jan...	182.3	150.6	196.2	201.5	217.1	236.5	242.2	294.6	333.6	355.0	356.2	393.0	405.8	425.0	436.4	457.9
Feb...	183.7	147.2	196.2	201.5	218.4	237.7	243.9	301.6	335.5	352.9	356.5	398.2	406.2	425.2	437.1	459.4
Mar...	184.3	145.9	196.5	201.5	218.9	237.9	245.4	303.3	334.2	352.5	360.0	399.3	407.4	424.9	436.7	459.6
Apr....	184.1	135.7	196.5	201.4	219.6	238.5	254.4	305.2	334.6	351.4	362.8	400.1	407.9	426.4	437.5	460.6
May...	183.6	136.4	196.6	201.2	220.1	238.5	258.1	304.6	333.9	348.9	364.3	401.1	410.3	426.2	438.2	462.6
June..	181.8	137.6	196.4	201.7	221.2	239.4	265.3	307.4	339.3	349.3	373.4	400.8	412.5	426.2	439.7	464.8
July...	184.3	139.5	196.8	201.7	223.5	239.6	267.3	308.9	342.4	349.5	377.7	400.3	414.5	435.2	444.1	467.5
Aug...	185.1	138.4	196.5	201.7	225.4	239.9	272.3	317.8	355.5	350.9	383.1	400.2	422.4	436.9	455.5	478.0
Sept...	185.1	139.6	196.6	203.1	225.5	240.1	272.4	322.6	356.7	352.0	392.2	400.3	424.4	436.0	454.3	.....
Oct....	188.0	140.0	198.5	204.2	225.9	240.4	273.0	327.3	357.1	353.0	397.4	403.4	424.8	436.0	455.5	.....
Nov...	188.0	139.5	201.2	206.2	226.6	240.6	274.0	329.2	355.9	352.9	390.2	404.5	426.0	436.0	456.3	.....
Dec...	188.0	140.0	201.2	208.2	226.6	240.8	280.0	333.1	355.6	353.2	391.4	405.8	424.9	435.5	456.8	.....
Av....	**184.9**	**140.9**	**197.4**	**202.8**	**222.4**	**239.1**	**262.4**	**313.0**	**344.5**	**351.8**	**375.5**	**400.6**	**415.6**	**430.8**	**445.7**	.....




% CHANGE FROM PRECEDING YEAR IN CONSTRUCTION COST INDEX


% CHANGE FROM PRECEDING YEAR IN BUILDING COST INDEX



ENGINEERING NEWS-RECORD CONSTRUCTION AND BUILDING COST INDEXES

THE ENGINEERING NEWS-RECORD Construction Cost Index was established in 1921, based on price movements in structural steel, portland cement, lumber and common labor. The Building Cost Index was introduced in 1938 to measure also the effect of skilled wage trends on costs. It uses the same materials as those in the construction cost index but skilled labor, instead of common labor.

A few minor changes have been made in these indexes over the years necessitated by changed conditions in the market. These are recorded in full in ENR, September 1, 1949, page 398, together with a complete history of the development and use of these indexes. New values originally reported monthly at the beginning of each month have also been reported each week beginning July, 1954.

Both indexes are based on 1913=100 but are reported also each week on 1926=100 and 1949=100 bases. These are weighted aggregative indexes, thus base years can be shifted at will.

ENR Construction and Building Cost Indexes reflect wage rate and material price trends. They do not adjust for labor or job efficiency, materials availability, competitive conditions, management, mechanization or other "intangibles" affecting construction costs.

- **A hypothetical block of construction** requiring 6 bbls of cement, 1.088 M ft bm of lumber, 2,500 lbs of steel and 200 hrs of common labor is used in the **Construction Cost Index** to measure the trend of the cost of heavy construction.

- **A similar hypothetical block of construction** using the same quantities of materials, but 68.38 hrs of skilled labor is the basis for computing the **Building Cost Index.**

This simple structure was adopted to facilitate prompt reporting of changes due to price and wage rate movements, both as to direction and degree.

Both indexes have proved, over the years, infallible as to direction and, in normal times, accurate as to degree. Under abnormal conditions of increasing or decreasing job productivity, allowance for the "intangibles" listed above should be made in measuring the degree of change in overall completion costs, or in construction selling price trends.

Supplement to Engineering News-Record, September 29, 1955. Business News Department, Engineering News-Record, 330 West 42nd Street, New York 36, N. Y. Reprints are available at fifty cents each.

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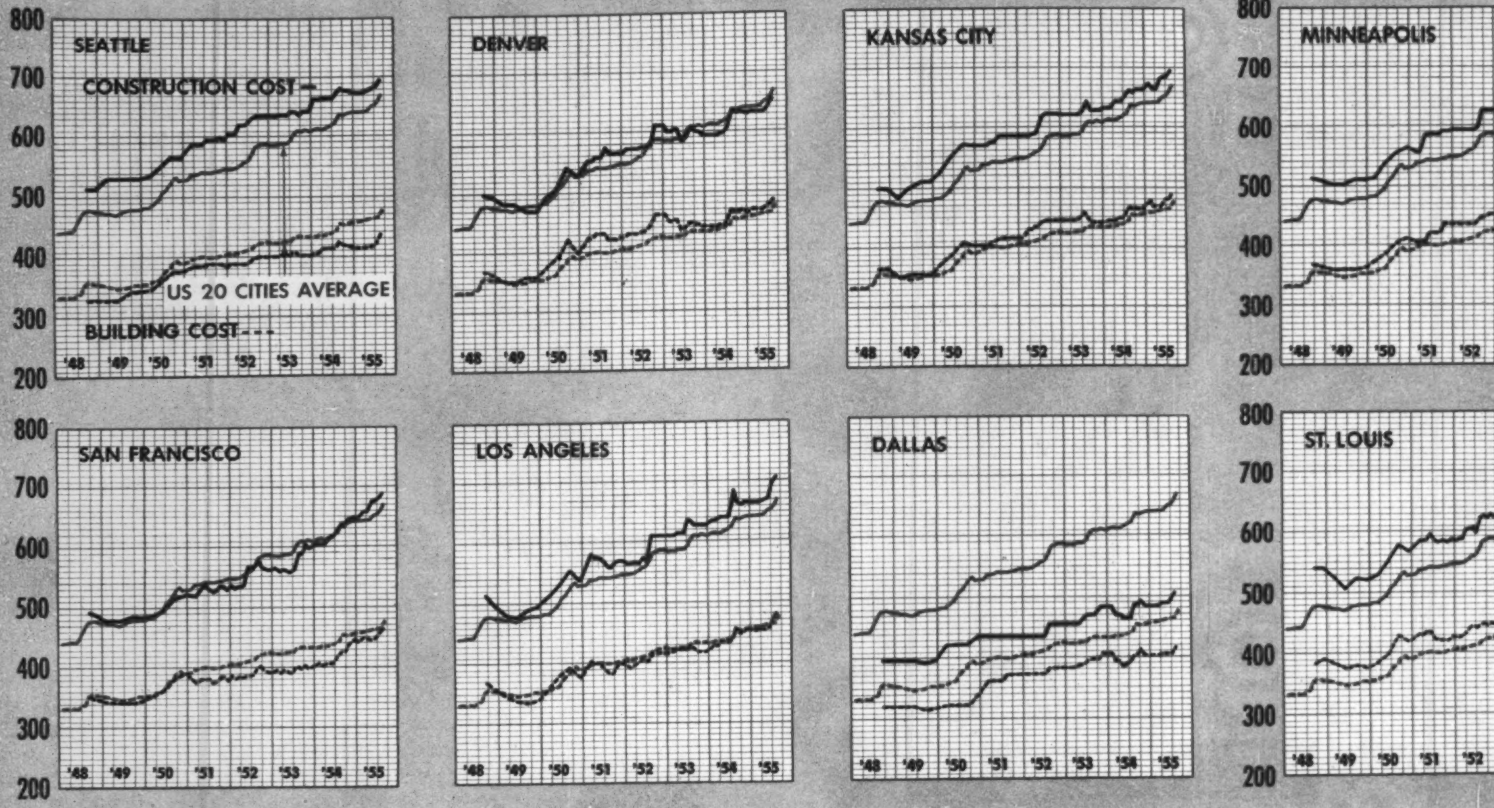


CONSTRUCTION COST INDEXES 1913=100

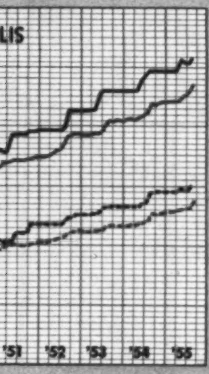
	1948		1949				1950				1951			
	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec
Atlanta	325	345	345	345	345	345	354	354	394	390	395	395	395	395
Baltimore	462	462	462	425	424	424	427	462	479	474	486	488	482	513
Birmingham	378	379	379	389	389	377	381	381	388	413	416	416	416	416
Boston	513	508	507	526	525	532	536	556	570	563	576	586	590	588
Chicago	537	530	527	526	541	542	550	584	607	593	603	598	620	624
Cincinnati	505	505	490	487	496	496	502	510	558	553	559	556	543	548
Cleveland	535	523	520	514	525	530	537	578	605	587	607	606	603	626
Dallas	398	398	398	398	394	397	422	423	423	438	437	437	437	437
Denver	499	496	482	482	470	470	491	505	541	528	552	558	564	564
Detroit	511	500	501	489	514	515	521	555	583	592	592	602	601	601
Kansas City	500	500	484	501	511	511	528	551	571	570	570	575	586	586
Los Angeles	511	495	482	478	489	494	511	529	552	537	580	572	558	569
Minneapolis	512	510	504	504	512	512	516	538	555	562	557	587	587	592
New Orleans	350	354	379	379	379	379	383	402	408	438	441	439	434	435
New York	549	541	537	534	533	539	546	575	632	622	630	627	621	626
Philadelphia	470	467	462	492	517	515	518	541	556	575	575	575	582	582
Pittsburgh	470	502	502	492	492	492	497	499	532	529	531	531	551	557
St. Louis	542	542	527	508	524	522	529	552	579	569	585	597	584	587
San Francisco	490	484	478	478	483	483	486	495	513	519	518	533	525	527
Seattle	512	512	530	530	530	530	534	548	564	563	586	586	593	592
Montreal	406	408	407	408	396	394	397	397	428	427	445	473	484	484

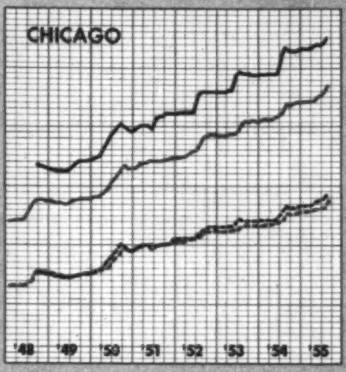
	1952												1953								
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Atlanta	395	395	395	395	395	397	397	402	402	418	418	418	418	424	424	438	438	438	444	460	460
Baltimore	510	510	510	508	509	511	525	531	530	530	533	526	528	528	524	528	525	525	531	554	551
Birmingham	416	416	417	417	417	417	445	450	450	450	450	450	450	450	450	449	447	447	454	469	469
Boston	585	588	590	587	611	614	625	630	630	633	633	629	626	626	626	627	625	623	630	630	626
Chicago	624	626	626	626	626	626	656	661	661	661	661	661	661	661	661	662	662	690	697	692	691
Cincinnati	547	547	547	549	549	553	551	612	612	612	611	609	609	609	609	613	613	613	639	637	633
Cleveland	624	625	625	668	685	685	685	686	684	683	683	682	680	682	682	682	683	706	712	711	709
Dallas	437	437	437	437	437	437	437	455	455	455	455	455	455	455	455	456	456	463	470	470	470
Denver	564	571	571	571	571	572	572	577	577	612	612	612	612	602	602	603	603	582	589	604	604
Detroit	601	621	621	621	622	625	641	646	656	666	666	663	665	665	663	663	663	663	689	687	687
Kansas City	586	586	586	586	588	588	618	623	623	623	623	623	623	623	623	623	623	623	629	643	630
Los Angeles	568	563	565	565	567	574	567	610	610	610	610	610	610	610	610	612	612	612	635	633	627
Minneapolis	593	593	593	593	593	593	593	598	628	628	628	628	628	628	628	629	629	655	661	661	661
New Orleans	435	435	435	435	435	437	461	466	466	466	466	466	461	461	476	486	486	486	506	506	506
New York	623	623	623	623	629	629	629	665	667	666	665	665	665	665	665	666	666	664	670	706	713
Philadelphia	582	582	601	601	601	616	631	636	636	636	636	636	636	636	636	637	635	635	641	666	666
Pittsburgh	557	557	557	557	557	557	600	607	607	607	607	607	607	607	607	608	608	608	640	640	640
St. Louis	584	587	587	605	605	608	599	626	629	626	631	628	627	627	627	626	626	648	654	654	653
San Francisco	534	529	532	532	535	565	562	570	573	562	560	559	560	561	557	561	558	556	561	588	587
Seattle	606	606	606	620	620	620	627	632	635	635	635	635	635	635	635	636	636	636	642	642	636
Montreal	502	500	500	500	500	510	510	512	512	512	512	512	515	516	516	516	516	516	516	540	550

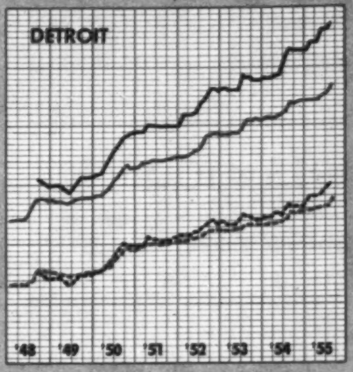
BUILDING COST INDEXES 1913=100

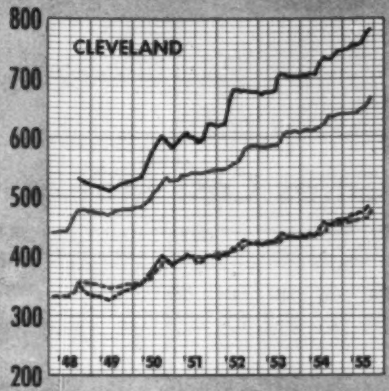
	1948		1949				1950				1951			
	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec
Atlanta	302	308	308	308	309	313	316	316	339	339	339	339	339	351
Baltimore	375	387	387	349	354	351	354	375	391	387	398	403	398	413
Birmingham	320	321	326	329	330	319	321	321	328	345	351	351	351	353
Boston	363	357	357	362	361	372	375	379	396	392	404	407	412	410
Chicago	360	353	350	349	352	353	361	381	404	391	401	395	408	413
Cincinnati	374	374	358	356	362	362	360	368	406	392	400	398	395	401
Cleveland	352	339	337	332	342	349	356	379	406	388	402	402	399	403
Dallas	322	322	322	322	316	318	322	323	323	338	362	362	371	371
Denver	369	365	351	351	359	359	378	395	423	400	426	432	423	425
Detroit	358	347	348	336	351	351	357	376	404	400	402	411	410	416
Kansas City	366	367	352	357	357	357	374	390	410	406	406	411	417	417
Los Angeles	368	356	343	339	336	340	360	380	392	377	403	395	381	398
Minneapolis	370	368	361	361	361	363	377	389	406	413	408	421	423	438
New Orleans	302	310	325	325	325	325	329	340	346	376	379	377	379	379
New York	403	395	400	398	397	402	410	439	464	459	466	463	457	462
Philadelphia	394	391	386	394	394	392	397	415	430	449	449	449	456	461
Pittsburgh	376	384	384	375	375	377	382	387	401	397	400	400	405	416
St. Louis	385	391	386	375	379	377	384	396	431	421	432	436	422	427
San Francisco	350	347	341	341	341	345	352	361	383	389	375	380	377	379
Seattle	328	328	328	328	340	341	344	358	374	374	384	384	389	383
Montreal	314	316	315	316	316	314	317	317	346	345	363	378	385	385

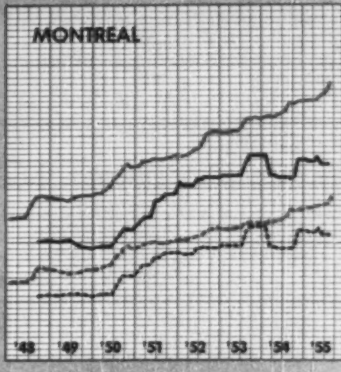
	1952												1953								
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Atlanta	351	351	351	351	351	353	356	364	364	368	371	371	371	376	376	376	376	376	383	394	394
Baltimore	410	410	410	407	409	414	415	421	420	420	423	416	418	418	414	418	415	415	425	429	427
Birmingham	353	353	355	355	355	358	361	366	372	372	372	372	372	372	372	370	372	372	382	382	390
Boston	407	410	411	409	419	422	421	426	426	429	429	425	422	422	422	422	421	419	428	434	433
Chicago	413	415	415	415	415	416	421	428	432	433	433	433	433	433	433	434	434	443	449	444	443
Cincinnati	400	400	400	402	402	406	408	423	423	423	422	420	420	420	420	424	424	424	435	433	435
Cleveland	401	403	403	410	419	419	423	432	431	429	429	428	426	428	430	430	431	435	442	441	439
Dallas	371	371	371	371	371	371	371	382	383	382	382	382	382	382	382	383	387	387	394	397	397
Denver	425	431	431	431	431	433	436	441	452	462	462	462	462	452	452	453	453	434	440	449	449
Detroit	419	419	419	419	422	424	430	435	439	442	442	438	441	441	438	438	438	441	452	450	450
Kansas City	417	417	431	431	434	434	441	446	446	446	446	446	446	446	446	446	446	452	458	455	442
Los Angeles	397	392	394	399	401	407	401	415	415	415	415	415	416	418	420	421	421	421	426	426	420
Minneapolis	438	438	438	438	438	438	438	443	450	450	454	454	454	454	454	455	455	459	467	468	468
New Orleans	379	379	379	379	379	381	391	396	397	397	397	397	397	397	398	407	407	407	419	419	419
New York	460	460	460	460	465	465	465	484	487	485	484	484	484	484	484	485	485	483	494	498	505
Philadelphia	461	461	462	462	462	472	472	477	477	477	480	480	480	480	480	481	479	479	490	492	494
Pittsburgh	416	416	416	416	416	416	419	427	427	427	439	439	439	439	439	440	440	440	460	460	460
St. Louis	424	427	429	431	441	444	442	445	448	445	450	447	446	446	446	446	446	446	452	458	457
San Francisco	385	381	383	383	386	386	388	398	401	393	391	390	391	395	391	395	392	390	398	398	397
Seattle	389	389	389	389	389	389	392	397	400	400	400	400	400	400	400	401	401	401	408	408	402
Montreal	385	383	383	383	383	393	393	396	395	395	395	395	398	399	399	399	399	399	399	423	430

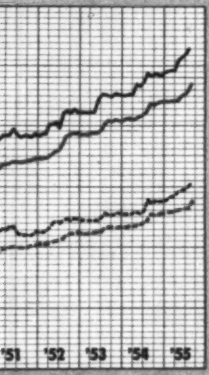


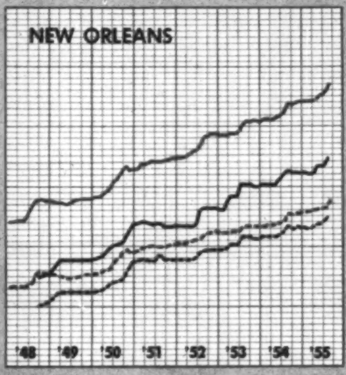


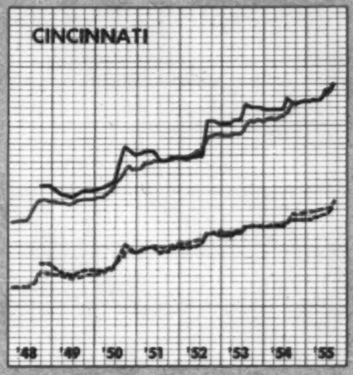


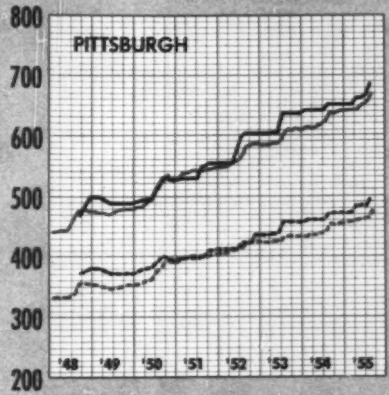


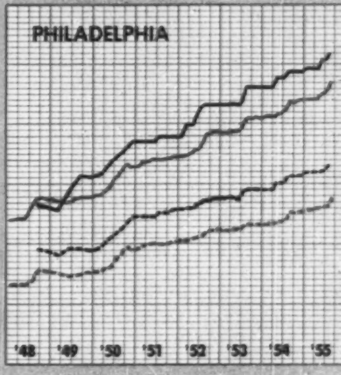


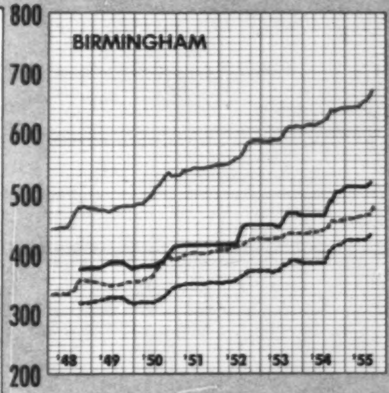


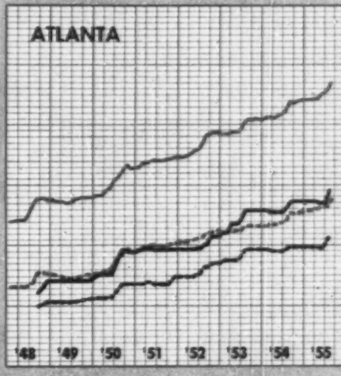












					1954												1955									
Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	8/18	
460	460	460	460	460	460	460	458	458	458	458	458	464	474	474	474	474	474	474	474	474	472	472	472	492	492	Atlanta
554	551	553	553	553	553	552	549	549	551	548	548	572	573	573	578	578	575	575	574	574	575	575	581	594	594	Baltimore
469	469	469	469	465	465	465	465	465	465	465	466	486	488	503	503	507	511	511	511	511	511	511	511	519	519	Birmingham
630	626	626	624	624	626	626	627	628	659	659	663	671	669	669	671	671	674	676	675	691	694	696	696	709	709	Boston
692	691	690	690	690	691	691	692	692	692	693	726	738	734	733	733	734	736	736	736	738	742	741	742	751	752	Chicago
637	633	633	633	631	630	630	630	630	630	630	650	644	641	641	641	642	642	642	645	645	647	664	664	673	673	Cincinnati
711	709	709	708	708	709	709	712	711	711	731	740	738	738	739	750	751	752	754	759	759	762	762	777	785	785	Cleveland
470	470	475	482	482	482	482	470	470	465	465	465	487	487	494	484	484	484	484	484	488	488	488	498	507	507	Dallas
604	604	600	600	595	595	595	595	595	597	597	609	638	633	633	635	632	632	635	635	635	635	637	647	656	656	Denver
687	687	682	682	682	685	685	685	689	690	700	721	732	729	729	729	729	730	743	743	743	763	763	767	776	776	Detroit
643	630	630	630	630	631	633	635	645	645	645	653	662	661	663	663	663	667	676	665	666	681	686	686	695	698	Kansas City
633	627	626	626	626	629	634	634	640	640	640	641	684	665	662	667	667	667	667	667	668	669	672	696	705	705	Los Angeles
661	661	661	661	661	661	661	661	661	661	681	682	697	697	697	697	697	697	697	697	697	717	711	711	720	720	Minneapolis
506	506	506	502	502	506	506	506	506	506	516	520	528	528	525	525	523	524	522	522	523	534	535	536	545	545	New Orleans
706	713	713	713	713	734	733	732	732	732	732	734	742	742	742	742	745	748	747	747	747	747	750	750	794	794	New York
666	666	666	666	666	666	666	666	666	681	681	681	689	691	691	691	691	696	696	696	696	696	711	712	721	721	Philadelphia
640	640	640	640	640	643	645	645	645	645	645	645	654	666	654	654	654	654	654	657	667	667	669	671	690	690	Pittsburgh
654	653	650	655	654	654	654	655	656	671	669	673	690	684	687	688	687	689	692	693	695	716	720	723	731	731	St. Louis
588	587	601	597	600	601	605	602	605	616	617	624	632	631	643	646	649	647	651	658	655	675	676	680	688	690	San Francisco
642	636	643	643	643	664	664	664	665	665	665	665	677	682	679	679	676	676	676	676	678	680	681	684	693	693	Seattle
540	550	550	550	550	550	550	516	516	513	513	513	528	526	515	542	542	542	541	541	541	548	537	537	537	537	Montreal

					1954												1955									
Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	8/18	
394	394	394	394	394	394	394	392	392	392	392	392	398	400	400	400	400	400	400	400	400	399	399	401	417	417	Atlanta
429	427	428	428	428	428	428	424	424	426	423	423	447	448	448	453	455	452	452	450	451	452	452	457	470	470	Baltimore
382	390	390	390	386	386	386	386	386	386	386	387	406	409	416	416	420	423	423	423	423	423	423	423	432	432	Birmingham
434	433	435	433	433	435	435	436	437	438	438	442	450	448	451	453	453	457	459	458	458	468	471	474	488	488	Boston
444	443	443	443	443	444	444	445	445	445	449	458	470	467	466	466	468	469	469	469	471	475	477	478	487	488	Chicago
433	435	436	436	434	433	433	435	435	434	434	437	444	444	444	444	445	447	447	450	450	452	456	458	467	467	Cincinnati
441	439	439	438	438	439	439	442	441	441	451	460	458	458	459	464	464	465	467	472	472	475	477	480	489	489	Cleveland
397	397	397	405	405	405	405	393	393	387	390	390	402	405	412	402	402	402	402	402	406	406	406	406	419	422	Dallas
449	449	446	446	441	441	441	441	441	443	443	455	470	468	468	469	467	467	470	470	470	470	474	475	485	485	Denver
450	450	446	446	446	448	448	449	453	454	452	458	470	467	466	466	466	468	481	481	481	481	490	494	503	503	Detroit
455	442	442	442	442	442	445	446	446	450	450	458	468	466	466	466	466	471	479	468	469	469	479	479	488	490	Kansas City
426	420	419	419	419	422	428	428	433	433	433	434	457	448	446	452	452	452	452	453	454	454	457	471	480	480	Los Angeles
468	468	438	468	468	468	468	468	468	468	473	476	491	491	492	492	492	492	492	492	492	499	493	493	502	502	Minneapolis
419	419	419	416	416	419	419	419	419	419	422	427	435	435	431	434	432	433	431	431	432	439	439	441	450	450	New Orleans
498	505	507	507	507	512	511	509	509	509	516	518	526	526	526	526	528	532	531	531	531	531	533	533	548	548	New York
492	494	494	494	494	494	494	494	494	503	503	503	511	516	516	516	516	521	521	521	521	521	523	524	533	533	Philadelphia
460	460	460	460	460	460	463	463	463	463	463	463	475	475	475	475	475	475	475	478	488	488	489	487	498	498	Pittsburgh
458	457	454	455	455	455	455	455	456	458	457	460	480	473	476	477	477	478	481	483	484	490	495	497	506	506	St. Louis
398	397	401	398	400	401	405	402	406	406	407	417	425	423	436	440	443	441	444	447	444	444	445	454	463	469	San Francisco
408	402	402	402	402	405	405	412	413	413	413	413	425	419	417	417	414	414	414	414	415	417	418	424	436	436	Seattle
423	430	430	430	430	430	430	396	396	393	393	393	393	391	395	422	422	422	421	421	421	428	417	417	417	417	Montreal

ENR Cost Indexes

Components of Construction Cost Index and weighting in U.S. cities are: 25 cwt structural steel shapes, base mill price; 6 bbl portland cement, bulk, 1.088 M ft bm 2x4, S4S lumber, 200 hr common labor, at local prices.

In Canada, warehouse price has to be used, so 15 cwt is weighting for steel. Price of Canadian steel is used prior to Oct. 1949 — the average of Canadian and U.S. steel prices is used after devaluation of Canadian dollar in Oct. 1949. Cement weighting is 10 bbl. Other elements are same as for USA cities.

Components of Building Cost Index and weighting are same but 68.38 hr of skilled labor is used instead of common labor.

These regional indexes were first reported quarterly fro
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July 195

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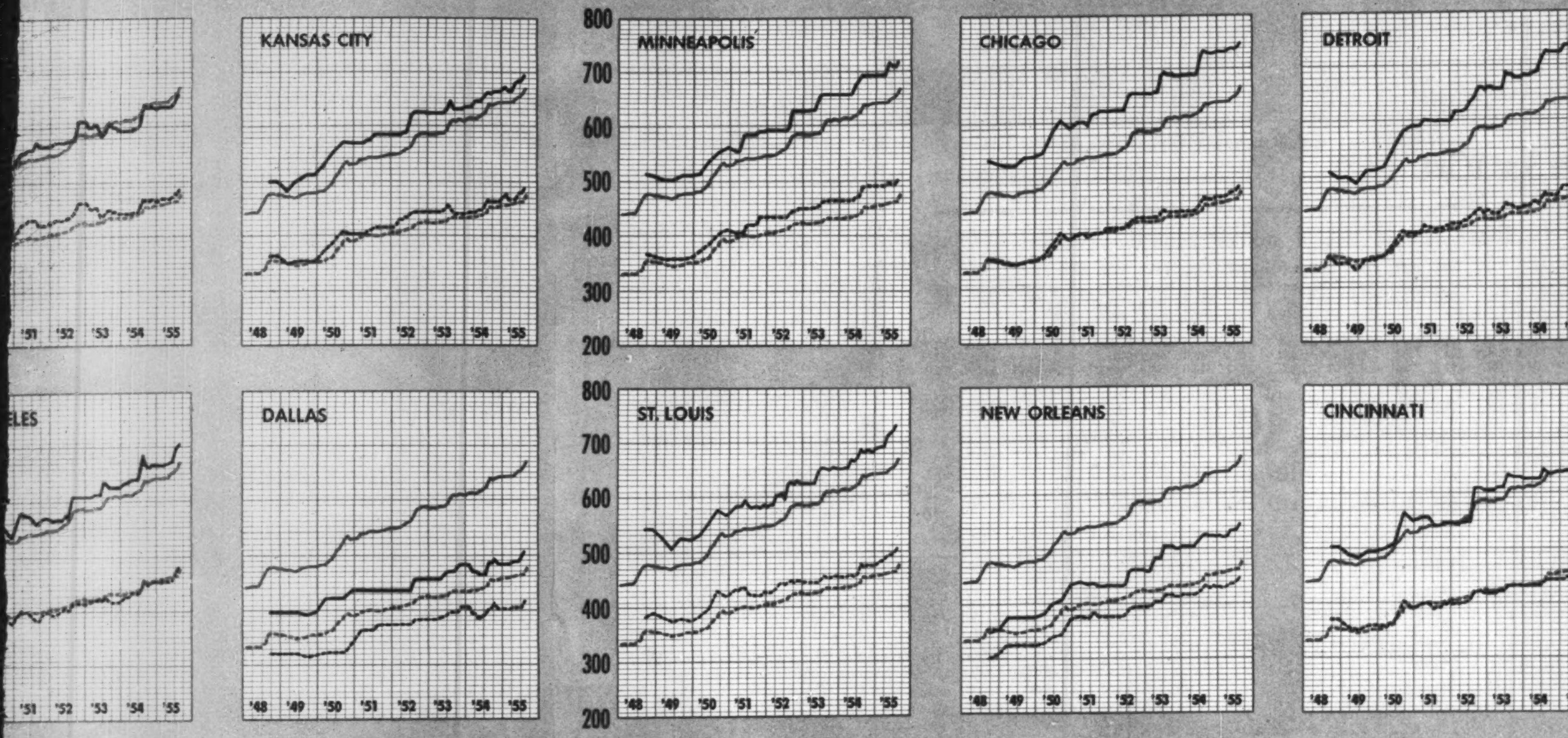

DEXES 1913=100

1951			1952												1953												1954												1955									
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395	395	395	395	395	395	395	395	397	397	402	402	418	418	418	418	424	424	438	438	438	444	460	460	460	460	460	460	460	458	458	458	458	458	464	474	474	474	474	474	474	474	474	472	472	472	492	492	Atlan
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598	620	624	624	626	626	626	626	626	656	661	661	661	661	661	661	661	661	662	662	690	697	692	691	690	690	690	691	691	692	692	692	693	726	738	734	733	733	734	736	736	736	738	742	741	742	751	752	Chic
556	543	548	547	547	547	549	549	553	551	612	612	612	611	609	609	609	609	613	613	613	639	637	633	633	633	631	630	630	630	630	630	630	650	644	641	641	641	642	642	642	645	645	647	664	664	673	673	Cinc
606	603	626	624	625	625	668	685	685	685	686	684	683	683	682	680	682	682	682	683	706	712	711	709	709	708	708	709	709	712	711	711	731	740	738	738	739	750	751	752	754	759	759	762	762	777	785	785	Clev
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572	558	569	568	563	565	565	567	574	567	610	610	610	610	610	610	610	610	612	612	612	635	633	627	626	626	626	629	634	634	640	640	640	641	684	665	662	667	667	667	667	667	668	669	672	696	705	705	Los A
587	587	592	593	593	593	593	593	593	593	598	628	628	628	628	628	628	628	629	629	655	661	661	661	661	661	661	661	661	661	661	661	681	682	697	697	697	697	697	697	697	697	697	717	711	711	720	720	Minn
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533	525	527	534	529	532	532	535	565	562	570	573	562	560	559	560	561	557	561	558	556	561	588	587	601	597	600	601	605	602	605	616	617	624	632	631	643	646	649	647	651	658	655	675	676	680	688	690	San
586	593	592	606	606	606	620	620	620	627	632	635	635	635	635	635	635	635	636	636	636	642	642	636	643	643	643	664	664	664	665	665	665	665	677	682	679	679	676	676	676	676	678	680	681	684	693	693	Seat
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1951			1952												1953												1954												1955									
Jun	Sep	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	8/18	
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407	412	410	407	410	411	409	419	422	421	426	426	429	429	425	422	422	422	422	421	419	428	434	433	435	433	433	435	435	436	437	438	438	442	450	448	451	453	453	457	459	458	458	468	471	474	488	488	Bost
395	403	413	413	415	415	415	415	416	421	428	432	433	433	433	433	433	433	434	434	443	449	444	443	443	443	443	444	444	445	445	445	449	458	470	467	466	466	468	469	469	469	471	475	477	478	487	488	Chic
398	395	401	400	400	400	402	402	406	408	423	423	423	422	420	420	420	420	424	424	424	435	433	435	436	436	434	433	433	435	435	434	434	437	444	444	444	444	445	447	447	450	450	452	456	458	467	467	Cinc
402	399	403	401	403	403	410	419	419	423	432	431	429	429	428	426	428	430	430	431	435	442	441	439	439	438	438	439	439	442	441	441	451	460	458	458	459	464	464	465	467	472	472	475	477	480	489	489	Clev
362	371	371	371	371	371	371	371	371	371	382	382	382	382	382	382	382	382	383	387	387	394	397	397	397	405	405	405	405	393	393	387	390	390	402	405	412	402	402	402	402	402	406	406	406	406	419	422	Dall
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411	417	417	417	417	431	431	434	434	441	446	446	446	446	446	446	446	446	446	446	452	458	455	442	442	442	442	442	445	446	446	450	450	458	468	466	466	466	466	471	479	468	469	469	479	479	488	490	Kan
395	381	398	397	392	394	399	401	407	401	415	415	415	415	415	416	418	420	421	421	421	426	426	420	419	419	419	422	428	428	433	433	433	434	457	448	446	452	452	452	452	453	454	454	457	471	480	480	Los A
421	423	438	438	438	438	438	438	438	438	443	450	450	454	454	454	454	454	455	455	459	467	468	468	468	468	468	468	468	468	468	468	473	476	491	491	492	492	492	492	492	492	492	499	493	493	502	502	Minn
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400	405	416	416	416	416	416	416	416	419	427	427	427	439	439	439	439	439	440	440	440	460	460	460	460	460	460	460	463	463	463	463	463	463	475	475	475	475	475	475	475	478	488	488	489	487	498	498	Pitts
436	422	427	424	427	429	431	441	444	442	445	448	445	450	447	446	446	446	446	446	446	452	458	457	454	455	455	455	455	455	456	458	457	460	480	473	476	477	477	478	481	483	484	490	495	497	506	506	St. L
380	377	379	385	381	383	383	386	386	388	398	401	393	391	390	391	395	391	395	392	390	398	398	397	401	398	400	401	405	402	406	406	407	417	425	423	436	440	443	441	444	447	444	444	445	454	463	469	San
384	389	383	389	389	389	389	389	389	392	397	400	400	400	400	400	400	400	401	401	401	408	408	402	402	402	402	405	405	412	413	413	413	413	425	419	417	417	414	414	414	414	415	417	418	424	436	436	Seat
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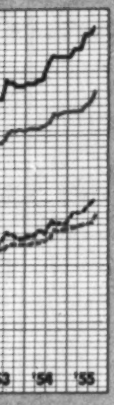

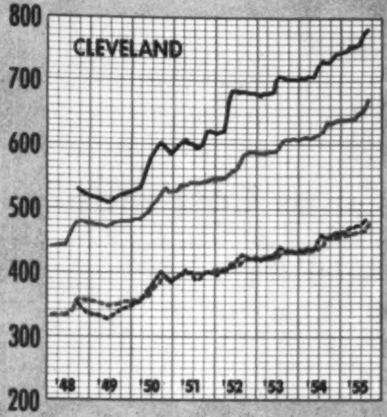

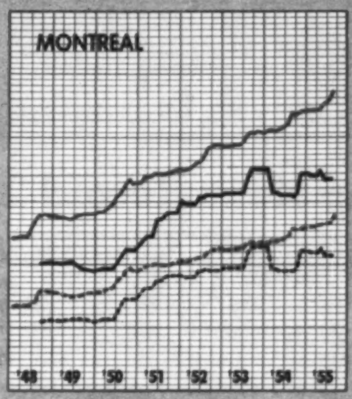

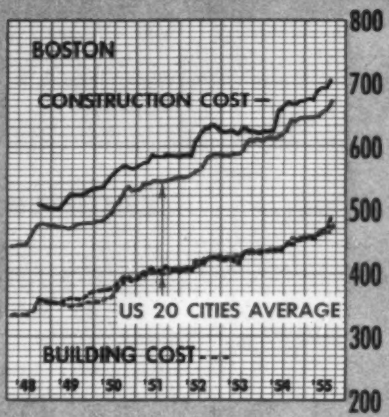

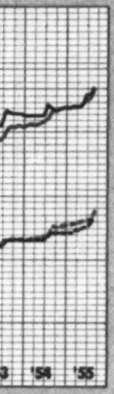

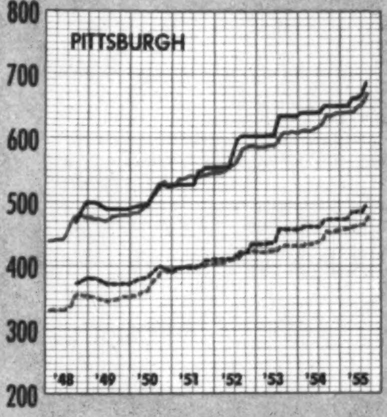

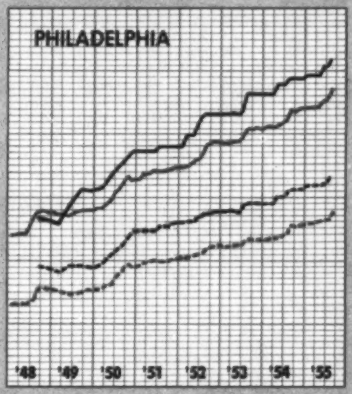

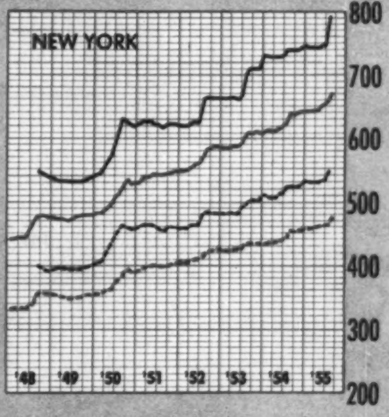

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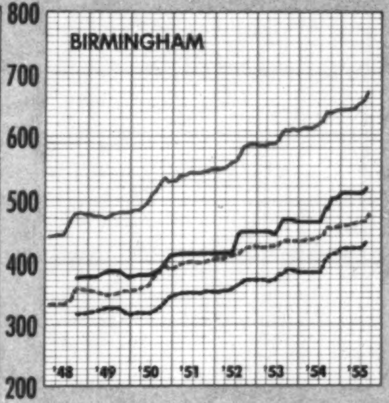
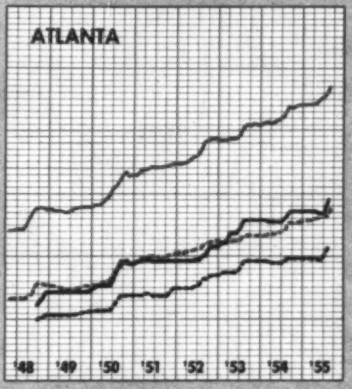
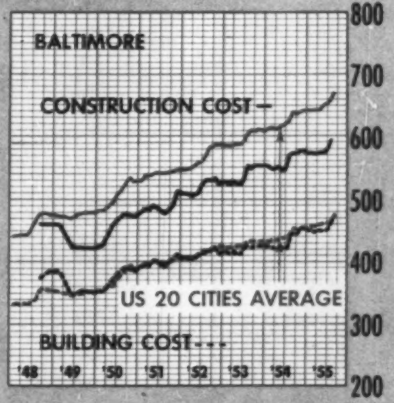
594	Baltimore
519	Birmingham
709	Boston
752	Chicago
673	Cincinnati
785	Cleveland
507	Dallas
656	Denver
776	Detroit
698	Kansas City
705	Los Angeles
720	Minneapolis
545	New Orleans
794	New York
721	Philadelphia
690	Pittsburgh
731	St. Louis
690	San Francisco
693	Seattle
537	Montreal

8/18	
417	Atlanta
470	Baltimore
432	Birmingham
488	Boston
488	Chicago
467	Cincinnati
489	Cleveland
422	Dallas
485	Denver
503	Detroit
490	Kansas City
480	Los Angeles
502	Minneapolis
450	New Orleans
548	New York
533	Philadelphia
498	Pittsburgh
506	St. Louis
469	San Francisco
436	Seattle
417	Montreal







ENR Cost Indexes in 21 cities

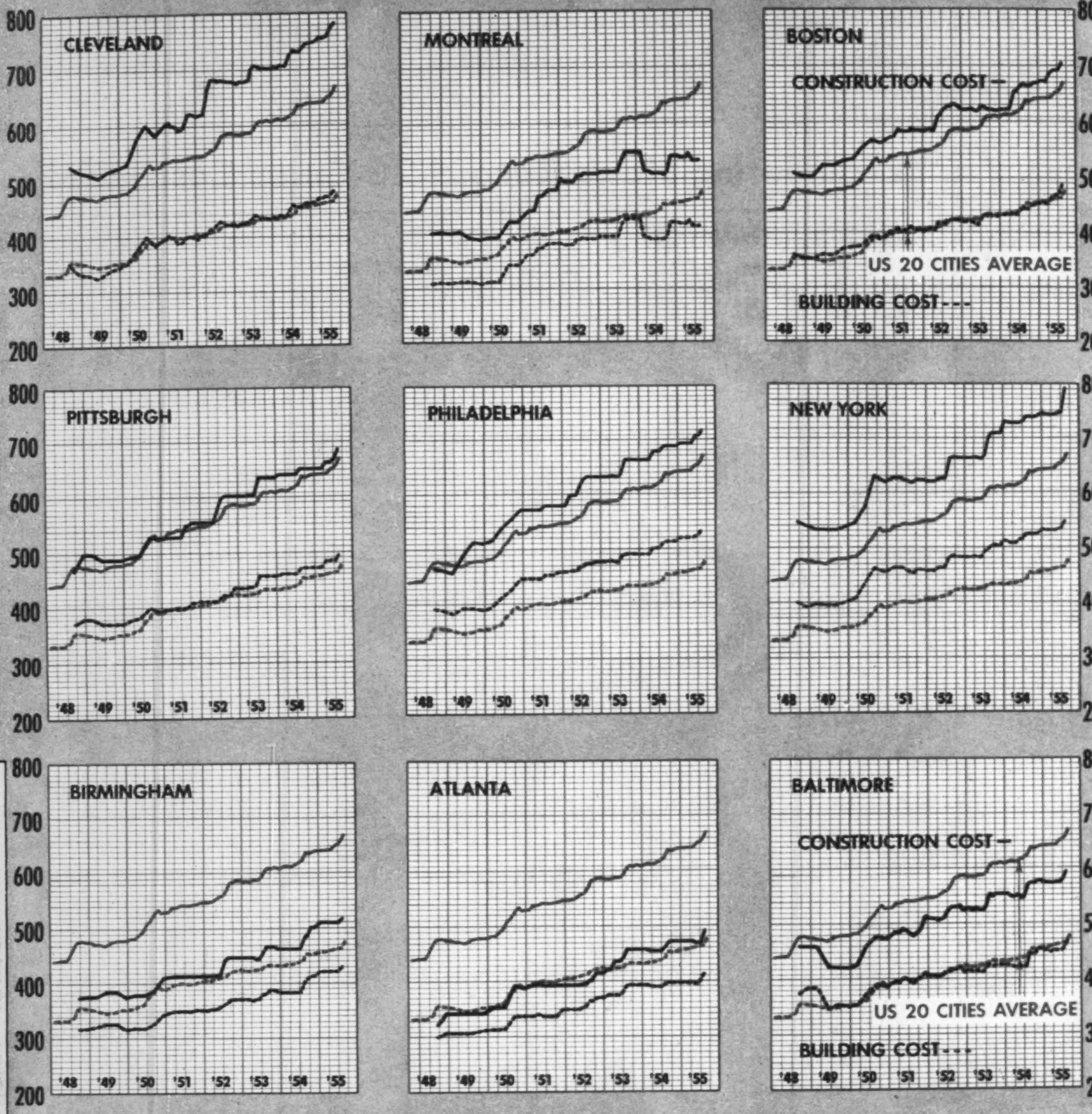
Components of Construction Cost Index and weighting in U.S. cities are: 25 cwt structural steel shapes, base mill price; 6 bbl portland cement, bulk, 1.088 M ft bm 2x4, S4S lumber, 200 hr common labor, at local prices.

In Canada, warehouse price has to be used, so 15 cwt is weighting for steel. Price of Canadian steel is used prior to Oct. 1949 — the average of Canadian and U.S. steel prices is used after devaluation of Canadian dollar in Oct. 1949. Cement weighting is 10 bbl. Other elements are same as for USA cities.

Components of Building Cost Index and weighting are same but 68.38 hr of skilled labor is used instead of common labor.

These regional indexes were first reported quarterly from September 1948 through March 1951, then monthly beginning April 1951. Each of the 21 cities indexes together with their components, has been reported weekly in Construction Daily starting July 1954.

These ENR Cost Indexes measure movements in the cost to contractors and engineers of construction materials and labor. They do not adjust for productivity. Where major differences between cities occur, the main reason is found usually in wage differentials. Lower wages are often accompanied by lower productivity, hence allowances for job productivity should be made in estimating end-product-price, or construction selling-price trends based on the cost trends shown here.



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1954-55 ANNUAL REPORT ON

Construction Costs

BY ENGINEERING NEWS-RECORD

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THE CONSTRUCTION boom added materials shortages and slow deliveries to the rising costs problems of 1955. Thus unscheduled costs piled on top of those calculated costs that were already a major concern of construction men.

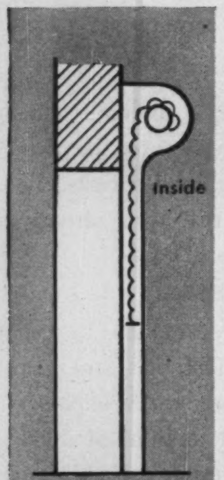
The squeeze continued for contractors between their low bid prices and higher materials and labor costs. Bids fifteen percent or more under engineers' estimates were common. This left millions of dollars to come back into the market in the form of additional calls for bids, notably in the case of highways.

More and more a keen knowledge of cost and price movements and trends is an essential tool for both engineers and contractors.

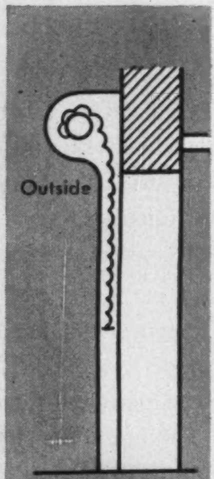
This issue, in the pages which follow, is dedicated to sharpening that tool.

MOST
VERSATILE
DOOR

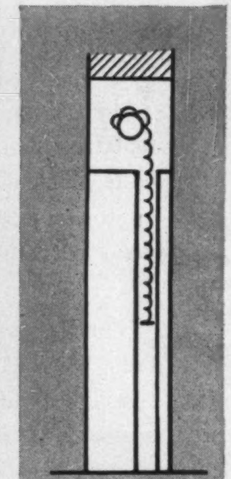
Six Basic Ways to Install

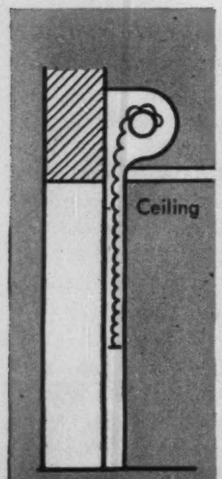


MOUNTED INSIDE

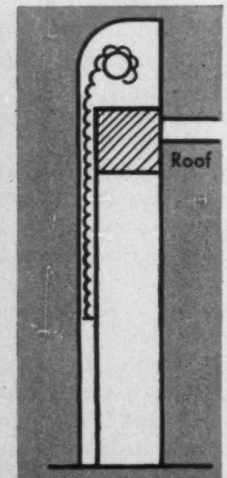


MOUNTED OUTSIDE

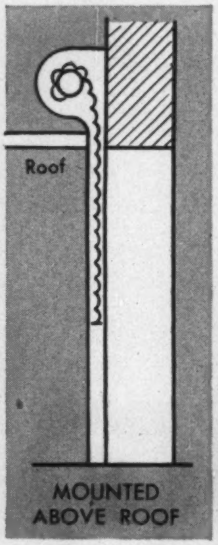

MOUNTED UNDER LINTEL



MOUNTED ABOVE CEILING



MOUNTED ON TOP OF WALL



MOUNTED ABOVE ROOF

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To Save Maximum Space, and Fit Any Building Design

The compact hood in which the Kinnear Rolling Door coils when opened, can be installed inside or outside the building . . . in the wall or on top of it . . . above the ceiling or above the roof . . . above or below the opening. The door can even be installed at any angle, (as shown below), upside down or horizontally.

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Kinnear Rolling Doors can be installed so that every inch of floor, wall and ceiling space around a doorway (inside, outside, or on both sides of the opening) is fully usuable at all times.

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Saving Ways in Doorways

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ROLLING DOORS

The '56 Outlook for Construction Costs

More capacity to produce and deliver basic construction materials will be the big factor in coming months, if construction men are to continue to hold their prices down in the face of rising costs.

This year's construction boom outran all predictions and produced shortages in steel, cement, plywood, in boxcars for carrying lumber, in copper and copper tubing, in aluminum sheets, in gypsum products particularly wall board and lath. The boom shows every sign of continuing unabated with consequent pressure on materials supplies.

• **Materials costs** went up faster than wage rates this year, up 6.7 percent in the ENR cost indexes compared with 3.3 to 3.7 percent for labor. But this does not include the high costs of slow deliveries and waits for materials, or purchases at premium prices.

• **Wages increased** from two to four percent for the year but averaged 3.7 percent for common labor, 3.3 percent for the three skills, carpenters, bricklayers and structural steel workers, including fringe benefits. Many of the new contracts have built-in increases effective in six-month or yearly periods for the duration of the contract. More of the new contracts are for two years and several are for the next five years.

• **The construction cost rise** is 5.1 to 5.5 percent as measured by the ENR indexes. This is more than the 3% rise that was predicted a year ago.

Thus this rise increased its momentum again this year and it shows no signs as yet of topping out. This is what the Petit Momentum Net Change and Trend Recognition Curves tell their readers in the pages that follow.

• **Construction selling prices** have continued low in relation to the rise in costs. There is ample evidence to support this fact in the pages where the bid price indexes are compared with the basic cost indexes, and where unit prices bid by contractors are shown.

However, some upturns in bid prices are evident in the West, with evidence that the ability of contractors to outwit the cost rise has about reached its limit.

The remarkable performance of contractors, engineers and architects in keeping construction "selling prices" down while basic costs for labor and materials have moved inexorably up can be credited to good design and management, and to high volume and turnover that enables contractors to work on a smaller profit margin.

The unit prices show also that more and more construction extends or replaces earlier structures, thus includes demolition and removal costs as well as strictly new construction.

• **Financing,** plentiful last year, tightened up this year along with government action designed to slow down and extend the construction boom and prevent it from blowing its top.

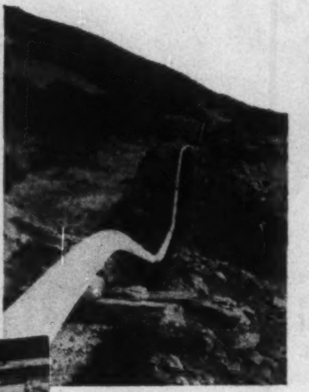
A couple of the big toll highway bond issues were withdrawn because of the higher rates for money, but will come back into the market at a more "favorable" time.

The effect on housing of the down-payment increase and higher mortgage rates is not evident as yet. The housing boom continues.

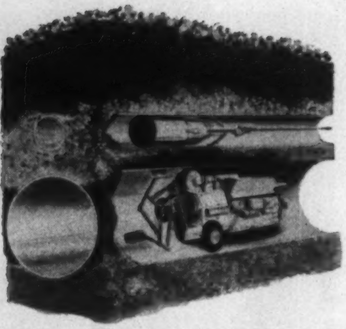
• **In the year ahead,** look for an increase, already begun, in contractor's prices.

Look also for a rise of 3 to 4 percent in basic materials and labor costs. Part of this is already built into wage agreements, part will depend on the amount of the new steel price rise expected next year.

Somastic® Pipe Coating applied to the exterior of ½" to 30" diameter pipe.



Pipe sizes 4" through 34" carefully wrapped to your specifications.



Steel or cast iron pipe lines 4" to 144" in diameter lined with cement mortar by either Tate or Centriline process.

9 REASONS WHY... it will pay you to do business with Pipe Linings, Inc.

Pipe Linings, Inc. offers you...

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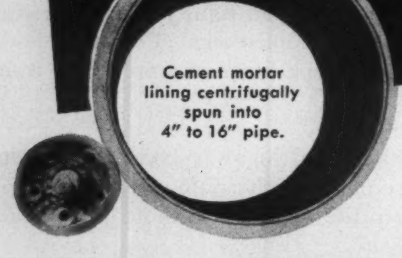
2. Complete service—
   Cement mortar lining of pipe lines "in place", to both AWWA and Federal specifications • Exterior protection. Somastic® Pipe Coating for corrosion resistance • Pipe wrapping to your specifications • Centrifugal spinning of cement mortar lining on in-plant machinery • Pipe reclamation. Permanent plant. Portable plant • Pipe cleaning • Pipe straightening • Pipe blasting • Spot welding of pits in pitted pipe • Pipe re-beveling.
3. Expert engineering assistance
4. Experienced plant and field personnel
5. Equipment especially designed to cut costs . . . proved over years of operation
6. Fully integrated plant facilities
7. Fully integrated field facilities
8. The ability to meet specific requirements of each customer on an individual basis
9. An organization with experienced management and adequate financial backing



Cement mortar lining centrifugally spun into 4" to 16" pipe.

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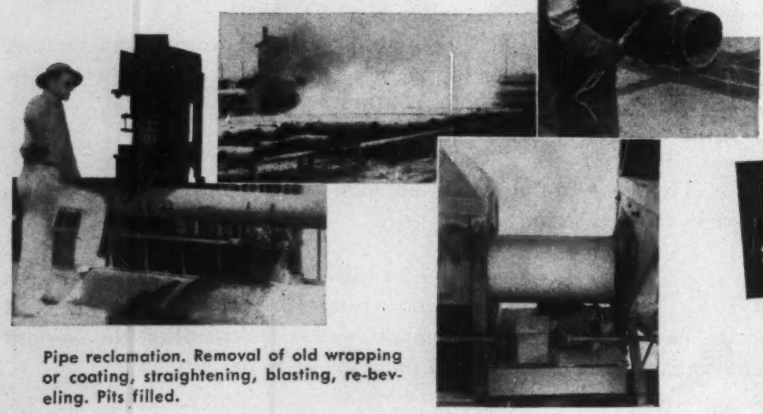
In increased pumping costs
In excessive maintenance costs

Write today on your organization letterhead for new brochure covering all phases of Cement Mortar Lining of Pipe Lines "In Place."



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Engineering News-Record Construction & Building Cost Indexes—1913 = 100

The tables of values for selected years and the graphs of the complete index from 1913 to date are to be found on the colored insert chart preceding this page.
Backing the 20-city-average charts are the complete tables and graphs recording the indexes for each of 20 U S cities and 1 city in Canada.

ENR Cost Indexes For Other Base Years

Engineering News-Record Cost indexes may be converted to any base year desired:

Index Value	Construction Cost Base Years '26=	'39=	'40=	'49=	Building Cost Base Years '26=	'39=	'40=	'49=
Year	100	100	100	100	100	100	100	100
1926....	100	88	86	44	100	94	91	53
1928....	99	...	...	...	102	...	...	...
1929....	100	...	...	...	103	...	...	...
1930....	98	...	...	...	100	...	...	...
1931....	87	...	...	...	91	...	...	...
1932....	75	...	...	...	76	...	...	...
1933....	83	...	...	...	80	...	...	...
1939....	113	100	...	...	107	100	...	...
1940....	116	103	100	...	110	103	100	...
1941....	124	109	107	...	114	107	104	...
1942....	133	117	114	...	120	113	110	...
1945....	148	131	127	...	129	121	118	...
1946....	166	147	143	...	142	133	129	...
1947....	199	175	171	...	169	159	154	...
1948....	222	196	190	...	186	175	170	...
1949....	229	203	197	100	190	178	173	100
1950....	245	216	211	107	202	190	185	107
1951....	261	230	224	114	217	203	198	114
1952....	274	242	235	119	225	211	205	118
1953....	288	255	248	126	233	218	212	122
1954....	302	267	260	132	241	226	220	127
	a	b	c	d	a	b	c	d

For conversion factors a, b, c, d, see table below.

Conversions to other base years are made by simple ratios:

$$I_{nb} = \frac{I_{ob}}{I_{nby}} \times 100 \text{ where}$$

I_{nb} is index on new base
I_{ob} is index value on old base
I_{nby} is old base index value for new base year

How to Convert Indexes To Other Base Years

To change base years for Engineering News-Record Construction and Building Cost Indexes, divide by following conversion factors;

To convert from base 1912=100 to base below	Divide 1912=100 values for Construction Cost Index by	Building Cost Index by
1949=100..............d	4.7702	3.5179
1947–49=100............	4.5033	3.3642
1940=100..............c	2.4196	2.0281
1939=100..............b	2.3551	1.9744
1926=100..............a	2.0803	1.8499
1925–29=100............	2.0695	1.8648
1926–29=100............	2.0702	1.8747
1929=100...............	0.0702	1.9086
1910–14=100............	0.9380	0.9477
1924=100...............	2.1536	1.8578
1923–25=100............	2.1204	1.8481
1914=100...............	0.8856	0.9191
1911=100...............	0.9343	0.9414

Applies to 20-cities index, not to individual cities

a,b,c,d conversion factors—used to get the accompanying table showing ENR cost index values for four different base years, 1926, 1939, 1940, 1949.

History and Use of ENR Cost Indexes

ENR's construction cost index was established in 1921 to measure the crazy ups and down of prices following World War I. It was carried back to 1913 by months and to 1903 by years.

The Building Cost Index was established in 1938 when common labor rates began to move up faster than skilled rates.

Both indexes reprice hypothetical blocks of construction made up of the big three materials, steel, lumber, cement and the big four construction trades, common labor, carpenters, bricklayers and iron workers. These are weighted like this:

Cost Index Weighting Components	Construction	Building
Steel ....cwt	25	25
Lumber, 2x4s .....Mbf	1.088	1.088
Cement ....bbl	6	6
Common labor .....hr	200	..
Skilled labor ....hr	..	68.38

Steel is priced at three mills—Pittsburgh, Gary, Birmingham

Skilled labor is priced by a straight average of carpenter, bricklayer and structural ironworker rates

Cement is priced in bulk, fob city, cash discount not deducted

Lumber is S4S, carlots, fob city except fob mill in Atlanta, Birmingham, New Orleans, Seattle; delivered in Dallas, Detroit, St. Louis; lcl at yard in Los Angeles, Minneapolis and delivered in trucklots in New York

Values for both indexes in each of the 20 US cities for which ENR reports prices and for 1 city in Canada are available from September 1948 to date, quarterly until 1951 then monthly.

Both indexes, the 20-city averages and for each of the cities separately, are now computed weekly and published in CONSTRUCTION DAILY.

These indexes are widely used to up-date cost estimates, to establish reproduction new values, to interpolate special purpose but less frequent and timely indexes, to serve as the base for constructing a special purpose index, to deflate construction dollar volume statistics and measure volume in "constant" dollars.

Construction Dollar Volume Compared With Volume Index

Year	Engineering construction volume million $	1913 $ volume equals 100	ENR volume index* 1913=100
1925...............	$2,559	426	218
1926...............	2,854	475	246
1927...............	3,254	541	279
1928...............	3,579	595	305
1929...............	3,950	657	334
1930...............	3,173	528	273
1931...............	2,432	404	226
1932...............	1,219	203	134
1933...............	1,068	178	110
1934...............	1,361	226	120
1935...............	1,590	264	143
1936...............	2,387	397	204
1937...............	2,438	405	190
1938...............	2,792	464	213
1939...............	3,003	499	228
1940...............	3,987	664	299
1941...............	5,869	976	430
1942...............	8,006	1,331	546
1943...............	3,062	509	204
1944...............	1,730	288	110
1945...............	2,289	381	146
1946...............	5,176	844	298
1947...............	5,659	941	271
1948...............	7,219	1,200	304
1949...............	8,157	1,358	345
1950...............	13,342	2,220	549
1951...............	13,605	2,264	522
1952...............	15,689	2,610	577
1953...............	15,171	2,524	506
1954...............	14,412	2,396	481
1955 (8 months)....	12,348	3,049	611

* corrected for cost changes by dividing dollar volume by ENR construction and building cost indexes and reducing to 1913=100

Composite Construction Cost Index—1947–49 = 100

Building Materials & Construction Div., Department of Commerce

By years		By months	1949	1950	1951	1952	1953	1954	1955
'34	48.2	Yr	103.0	106.5	115.5	119.2	122.0	121.9	....
'35	46.6								
'36	48.2	J	105.7	101.8	113.2	118.4	120.8	121.9	122.6
'37	51.4	F	105.6	102.3	114.2	118.4	120.7	121.0	122.7
'38	51.7	M	104.8	102.3	114.4	118.4	120.8	121.3	123.2
'39	49.0	A	104.2	102.7	114.9	118.7	120.8	121.2	123.9
'40	50.1	M	103.2	105.0	115.4	119.6	121.1	121.4	124.3
'41	54.0	J	103.1	106.1	115.8	120.8	122.1	122.0	124.7
'42	61.0								
'43	64.7	J	101.9	107.7	116.1	122.0	123.1	122.0	126.0
		A	101.4	109.6	116.3	122.6	123.1	121.9	....
'44	64.4	S	101.6	110.2	117.0	123.0	123.1	122.1	....
'45	66.7								
'46	76.5	O	101.8	110.1	117.5	122.6	122.8	122.6	....
'47	93.3	N	101.8	110.4	117.6	122.5	122.9	122.4	....
'48	104.0	D	101.6	111.8	117.5	122.5	123.0	122.5	....

This is a composite of special purpose and general construction cost and price indexes weighted monthly by estimated dollar volume of construction put in place.
On some types of work two indexes are used, one special purpose for deflating, the other, available monthly, for interpolating for the months between the less frequent values of special purpose indexes.

By classes of construction the indexes used are: residential, Boeckh; industrial building, Turner—Boeckh; warehouses, office and loft buildings, Fuller—Boeckh; other private and public buildings, American Appraisal; farm dwellings, Bu of Agriculture Economics—Boeckh; farm service buildings, BAE—Amer Appr; railroad, ICCRR—ENR Construction; telephone & telegraph, ICCT&T—ENRC; electric and gas utilities, Handy-Whitman—ENRC; petroleum pipeline, HW—ENRC & ICC—ENRC; all other private, aver ENRC & Assoc. General Contractors. Military and Naval, aver of Amer Appr, Bu of Public Roads—ENRC, Fuller—Boeckh, Turner—Boeckh; highway, BuPR—ENRC; sewer & water, aver AGC & ENRC; misc public service, aver HW—ENRC; conservation & development and all other, aver AGC—ENRC.

Current dollar volume estimates for each type of construction are deflated by the indexes indicated and the sum of all deflated segments is computed. This is divided into the estimated total of all types of construction in current dollars to compute the values in the table for the Department of Commerce Composite Construction Cost Index.

No Topping-Out In Sight For The Cost Rise

Last year's prediction on construction costs still holds: "This is a situation which can erupt into a violent price movement—either up or down—but not before the Net Change curve flags the warning". This is how George H. Petit diagnoses the costs outlook.

The 30-point rise in the past year includes the third largest month-to-month increase since the volatile period of World War I, 10.5 points from July to August 1955. The two greater month-to-month rises are 13.97 points in the same months of 1954 and 15.67 points from December 1946 to January 1947.

At no time during the year has there been the slightest technical indication of a probable major decline in the index. Quite the contrary. Moreover there still is no evidence that the peak of this inflationary advance is in sight.

The clue to the positive upturn was given by the Net Change trend penetration in the 2nd quarter of 1954.

However, the Net Change curve is decreasing in intensity, like a "damped" curve in mathematics and the physical sciences. It is gradually coming to a point of dead center in its movement, caused by more frequent periods of stability in the Basic Index than have hither prevailed.

But this leads into the most difficult situation to diagnose, one that could erupt into a violent price movement up or down or that could just level off on a stable plateau. Watch the Net Change curve for its warnings.

This is what to look for in each of the three indicators:

Basic Index Curve—This shows direct monthly variations in the ENR Construction Cost Index.

Petit Trend Recognition Curve—This smooths out the monthly variations in the Basic Index Curve by using 12-month moving averages. Each quarter the high and the low of these are plotted and connected to form the blocks shown.

- The blocks measure the strength of the cost movement. They expand with increasing strength, contract as strength wanes.
- The gaps between the blocks measure the momentum. The wider the gaps the greater the momentum.
- The trend lines, set by the bottom corners on an up-movement and by the top corners on a down movement, measure the direction of the movement and sound the alert on a major change. The direction or course of the price movement is shown by the pitch of the trend lines. A major change is in progress when a block penetrates a trend line.

Momentum Net Change Curve—This measures graphically the acceleration or deceleration in change in the Trend Recognition curve. Its blocks represent the high and the low of the 3-month spread between values of the 12-month moving average.

The closest we have come to a trend reversal, since the uninterrupted rise that started in 1939, was in 1949. Note that then:

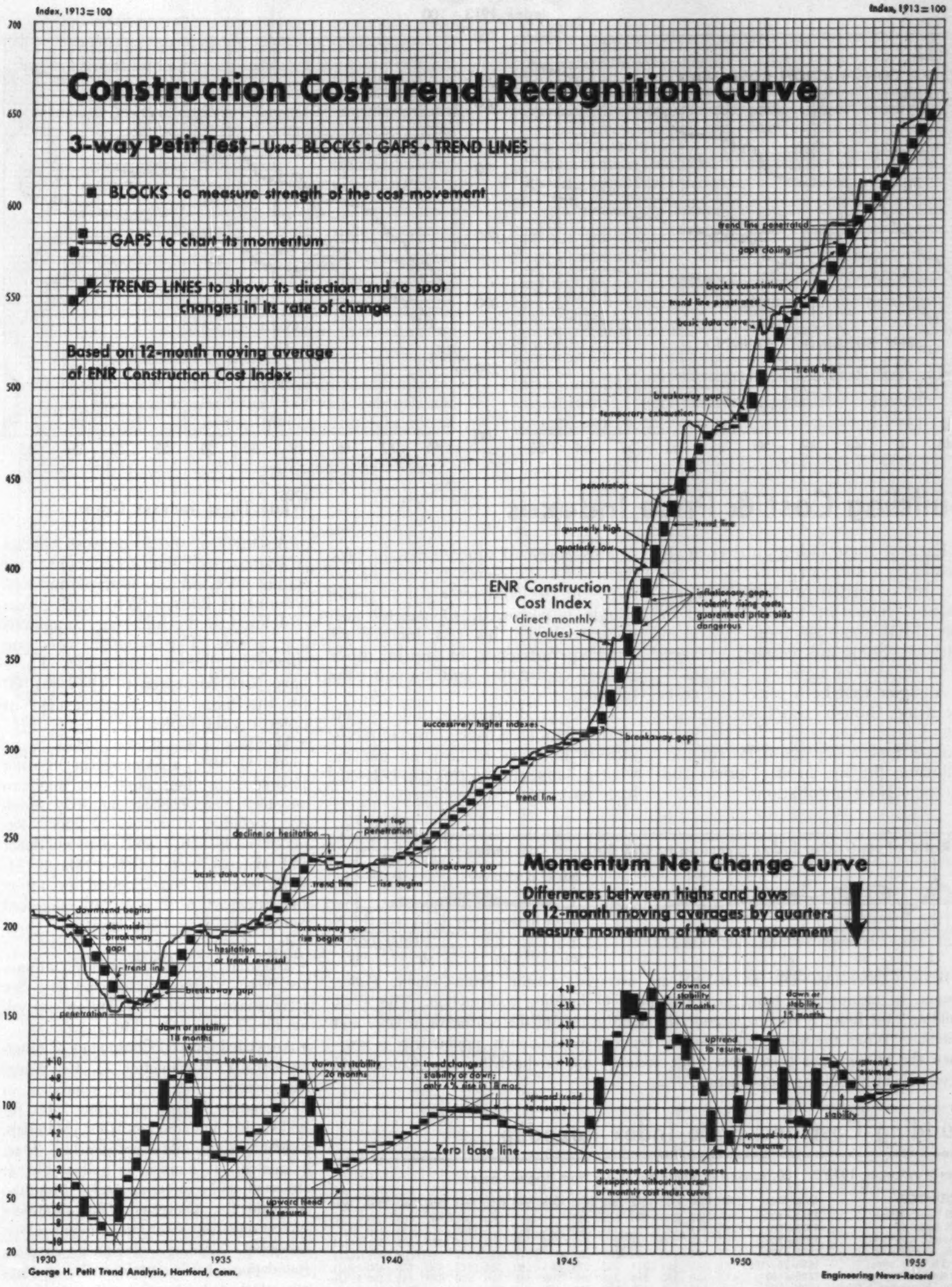
1—The Basic Index Curve crossed the Trend Recognition Curve.

2—The Trend Recognition Curve crossed and left its trend line, its blocks closed up to mere lines and its gaps closed.

3—The Momentum Net Change Curve dropped sharply almost all the way to the Zero Base Line. But it did not cross. Then a new uptrend set in.

The Basic Index Curve is the first indicator of each movement but it does not show whether the movement is temporary or lasting.

The Momentum Net Change Curve hoists the first positive signal that a new major trend is under way.


Construction Cost Trend Recognition Curve

3-way Petit Test – Uses BLOCKS • GAPS • TREND LINES

■ BLOCKS to measure strength of the cost movement

GAPS to chart its momentum

TREND LINES to show its direction and to spot changes in its rate of change

Based on 12-month moving average of ENR Construction Cost Index

Momentum Net Change Curve

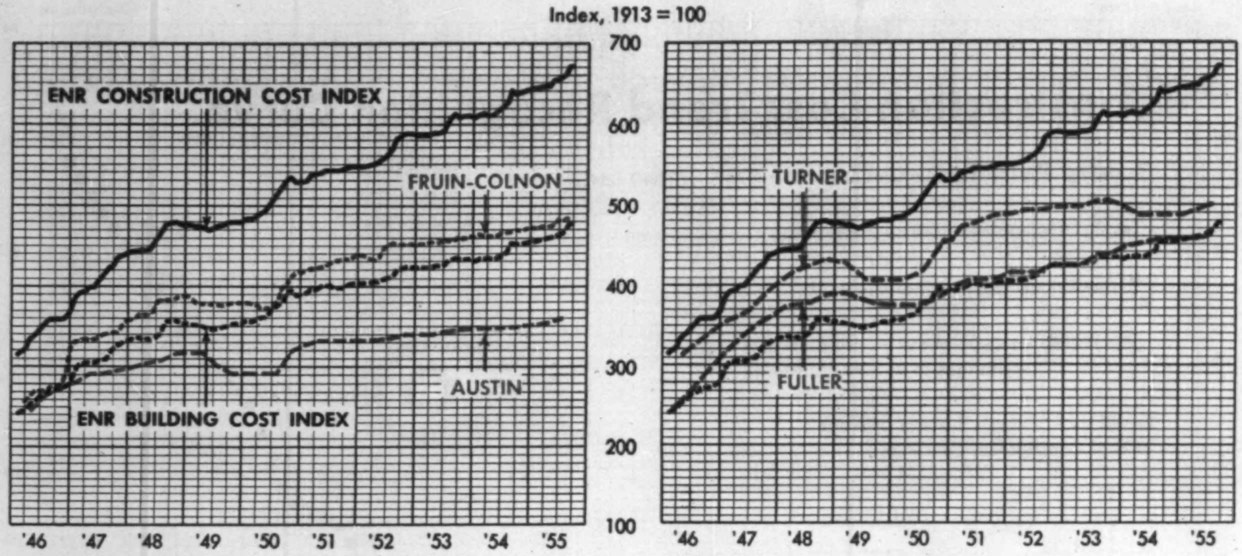
Differences between highs and lows of 12-month moving averages by quarters measure momentum of the cost movement

George H. Petit Trend Analysis, Hartford, Conn.

Engineering News-Record

Index, 1913=100
Index, 1913=100
700
650
600
550
500
450
400
350
300
250
200
150
100
50
20
1930
1935
1940
1945
1950
1955
ENR Construction Cost Index (direct monthly values)
downtrend begins
downside breakaway gaps
trend line
breakaway gap
penetration
hesitation or trend reversal
basic data curve
trend line
breakaway gap rise begins
decline or hesitation
lower top penetration
rise begins
breakaway gap
trend line
successively higher indexes
breakaway gap
inflationary gaps, violently rising costs, guaranteed price bids dangerous
quarterly high
quarterly low
penetration
trend line
temporary exhaustion
breakaway gap
trend line
basic data curve
trend line penetrated
blocks coexisting
gaps closing
trend line penetrated
+10
+8
+6
+4
+2
0
2
4
6
8
10
+18
+16
+14
+12
+10
down or stability 18 months
trend lines
down or stability 20 months
upward trend to resume
trend changes: stability or down; only 4% rise in 18 mos.
upward trend to resume
Zero base line
movement of net change curve dissipated without reversal of monthly cost index curve
down or stability 17 months
uptrend to resume
upward trend to resume
down or stability 15 months
stability
uptrend resumed

THE CONSTRUCTION COST RISE, **as predicted a year ago, picked up strength this year over last, but not with the momentum of previous upward movements. All three cost trend curves point to a continuing rise: the Basic Index Curve, in color, stays above the moving average blocks of the Trend Recognition Curve. The moving average blocks have pulled their trend line up to a steeper pitch and this has not been penetrated by a quarterly block. Finally, the Momentum Net Change Curve is again rising on the plus side of its zero base line but with less force than before.**



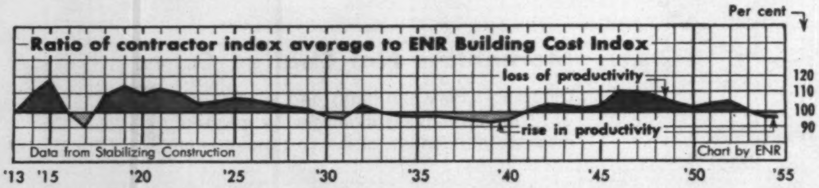
Building Cost & Price Indexes

Each of these indexes arrives at its answer by a different route. Some adjust for estimated productivity, some do not. Some are highly focused or specialized, some are more general in purpose. Some are national averages, some are local or regional.

All agree that both prices and costs are rising, though costs have been going up faster than prices. But the price indexes took a big jump this summer following the rise in steel prices and the new labor negotiations.

This price-cost squeeze may be productive for the owner but not necessarily for the contractor whose profit margin is narrowed. Contractor failures are lower this year for general building contractors, but up for other general contractors and for sub-contractors.

The special purpose indexes are plotted here on a background of ENR indexes in order to keep an eye on what is happening to this gap between basic costs and "selling" prices.



THESE CONTRACTOR INDEXES are averaged, Austin, Fruin-Colnon, Fuller, Turner, to measure the trend in selling price of building construction. The ENR Building Cost Index is used to measure the trend in cost to the contractor of labor and materials. When the selling price goes up faster than basic costs, productivity is low—when the selling price goes down while costs go up, productivity rises.—Colean and Newcomb in Stabilizing Construction.

Building Cost and Price Index Roundup

Yearly averages, 1913 = 100, converted where necessary from original base

WEIGHTED	Orig. Base	1926	1932	1939	1942	1945	1946	1948	1949	1950	1951	1952	1953	1954	1955
ENR Construction	1913=100	208	157	236	276	308	346	461	477	509	542	569	600	628	673S
ENR Building	1913=100	185	141	197	222	239	262	345	352	375	401	416	431	446	479S
American Appraisal*	1913=100	217	155	200	241	271	322	490	490	500	532	553	577	591	611Jl
Assoc. Gen. Contr	1913=100	197	171	188	209	231	257	332	342	357	377	388	408	426	443Jl
Boeckh, U. S. aver	1926-29=100	181	144	191	214	252	275	365	369	386	415	430	445	450	469Jl
Marshall & Stevens	1926=100	185	130	183	218	248	288	368	365	390	430	436	448	459	474Jn
Smith, Hinchman & Grylls*	1926=100	185	128	199	226	285	319	405	395	426	476	499	504	500	533A
ICCRR Sta & Off Bldgs	1910-14=100†	184	141	166	208	244	291	364	368	390	412	426	438	442	.....
WR & A—RC Bldg Pac Div	1911-14=100†	191	153	192	240	248	273	393	416	426	460	467	489	510	529Jl

* Correct for productivity.

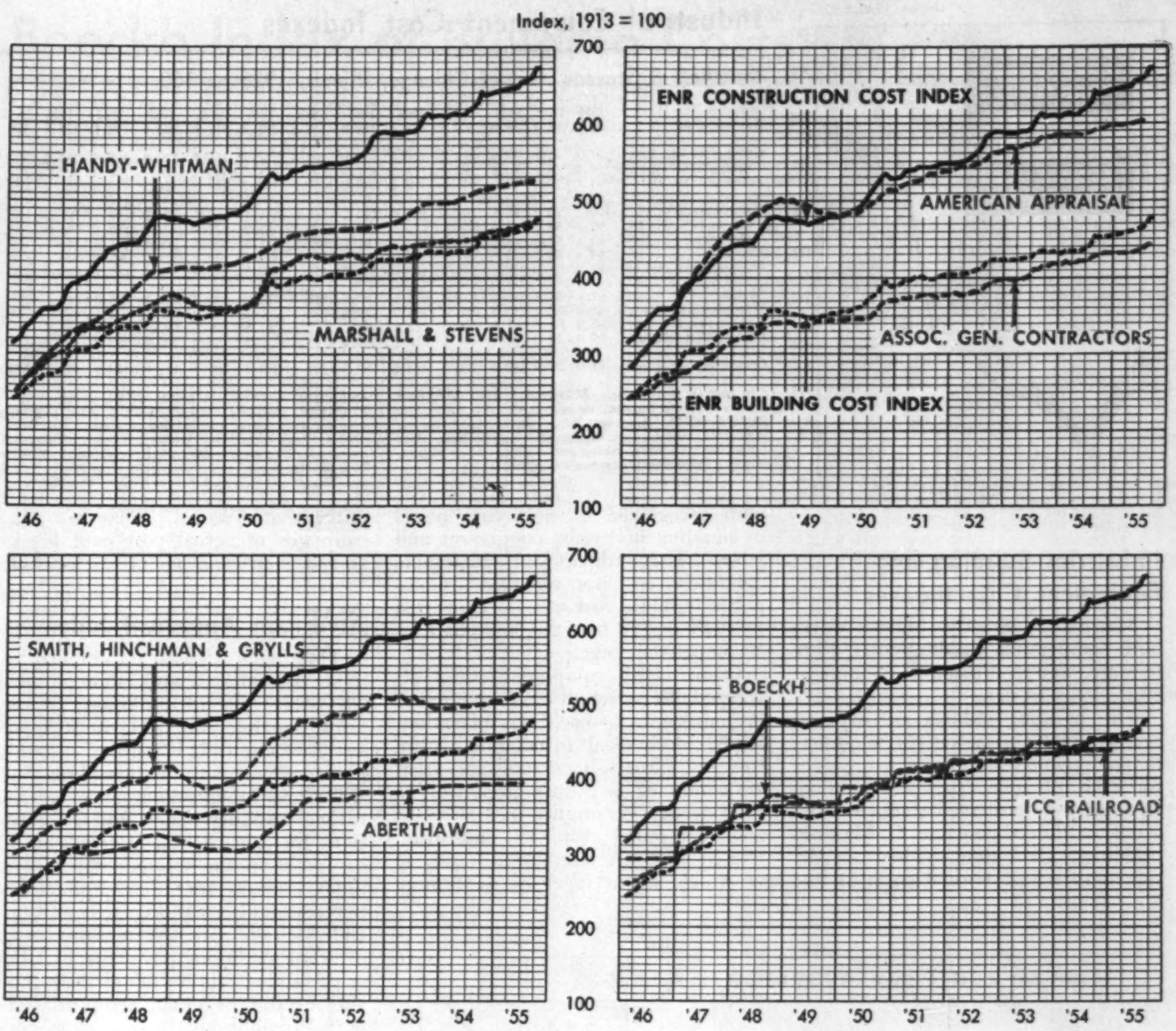
CONTRACTOR	Orig. Base	1926	1932	1939	1942	1945	1946	1948	1949	1950	1951	1952	1953	1954	1955
Aberthaw	1914=100†	197	168	190	223	236	279	321	312	321	370	381	388	394	463Jn
Austin	1926=100	185	117	152	213	234	273	317	307	313	337	342	347	352	361Jn
Fruin-Colnon	1926=100	218	178	208	227	247	285	382	382	398	433	449	460	469	486Jl
Fuller	1913=100	202	157	195	229	241	290	380	382	377	405	416	429	450	463Jl
Turner	1939=100	195	136	182	245	263	318	422	414	427	478	490	500	489	500Jl

† Not converted to 1913=100. •Jn June •Jl July •A Aug •S Sept

What These Indexes Cover

A variety of special purpose indexes is represented here. The contractor selling price indexes, appraisal indexes, accounting indexes. What each covers is defined in the following paragraphs and pages. The original bases are shown in the roundup table. These have been converted to 1913 = 100 for the table and charts, except as noted on the table.

- **Aberthaw Co., Boston, Mass.**—Since March 31, 1946, a composite of 36 major cost items in three multi-story and two one-story New England industrial buildings, including all mechanical trades. Repriced using actual and estimated labor and material costs. Before March 31, 1946, based on New England seven-story and basement, 62′4″ x 202′4″, reinforced concrete building built in 1914. Quarterly.
- **American Appraisal Company, Milwaukee, Wis.**—30-cities average used here. See accompanying page for definition and values for 22 cities. Monthly.
- **Associated General Contractors of America (AGC), Washington, D. C.**—Wages and materials for 12 cities combined in 40-60 ratio. Wages, prevailing rates for hod carriers and common labor. Materials, weighted: sand, gravel and crushed stone, 1; cement: 1; lumber, 1; hollow tile, ½; structural and reinforcing steel ½. Monthly.
- **Austin Co., Cleveland, Ohio.**—Reprices typical one-story, steel frame, monitor type industrial building. Includes concrete foundations; brick curtain walls; continuous steel sash; concrete floor laid on ground; 2-in. wood roof deck on timber purlins covered with 4-ply waterproofing, monitor sash with mechanical operators, but no heating, lighting, plumbing, sprinkler or other services. Priced for central and eastern states. Quarterly.
- **E. H. Boeckh & Associates Inc., Wash-**



ington, D. C.—20-cities average for 5 commercial and factory buildings price indexes used here. See accompanying page for definition and values for 10 classes of buildings in 21 of the 47 U S cities covered. Monthly.

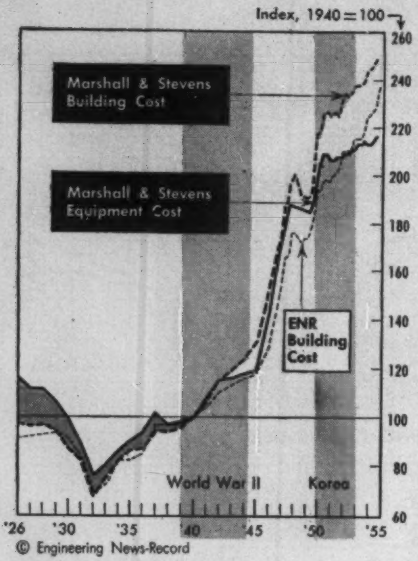
- **Fruin-Colnon Contracting Co., St. Louis, Mo.**—Industrial plant of five buildings in St. Louis repriced on basis of contractor's actual and estimated material and labor costs. Monthly.
- **George A. Fuller Co., New York, N. Y.** Composite of 36 major cost elements, in three commercial type buildings, including mechanicals, elevators, wiring, heating and ventilating, repriced. Quarterly.
- **Marshall and Stevens, Inc. of Illinois, Chicago, Ill.**—Building cost index used here. See accompanying page for its description and for industrial equipment cost indexes. Quarterly and annual for ENR.
- **Smith Hinchman & Grylls Inc., Detroit, Mich.**—Actual in-place costs, using building material costs, freight rates, skilled and unskilled labor rates and including labor efficiency and premiums, bidding competition, contractor profit margins and overhead. Figured with the contractor overhead are taxes, duration of projects, material expediting and labor procurement. Monthly.
- **Turner Construction Co., New York, N. Y.**—Eastern cities. Own cost experience on labor rates, material prices, productivity of labor, efficiency of plant and management, competitive conditions, forecast of price trends. Quarterly and special as needed.
- **Railroad Construction Cost Indexes ICC, Washington, D. C.**—Stations and office building series used here. See accompanying page for definition of this ICC analysis of major contracts. Annual.
- **Handy-Whitman, Whitman, Requardt & Associates, Inc., Baltimore.**—Reinforced concrete building in the Pacific Division series used here. See accompanying page for definition and selected series values for 7 of 103 utility construction cost elements. Semi-annual.

Price-Earnings Composite Index, Building Construction

Bureau of Labor Statistics, Base 1947-49=100

By years			By months						
			1949	1950	1951	1952	1953	1954	1955
'34	44.4	Yr	103.7	110.3	119.9	121.6	126.2	128.9	....
'35	44.6								
'36	45.1	J	105.4	104.6	119.0	120.2	123.8	128.1	131.1
'37	49.6	F	105.3	105.5	119.7	120.5	124.2	128.1	131.4
'38	48.1	M	105.1	106.2	120.0	120.8	124.9	128.1	131.1
'39	48.7	A	104.5	106.4	120.0	120.9	125.3	127.8	131.5
'40	50.6	M	103.8	107.6	120.3	120.4	125.5	127.7	131.9
'41	54.4	J	103.1	108.3	120.1	120.0	125.7	127.5	131.9
'42	59.6								
'43	62.2	J	102.3	109.5	119.7	121.0	126.8	128.7	....
		A	102.2	111.6	119.6	121.8	126.9	129.3	....
'44	64.9	S	192.4	114.1	120.2	122.7	127.3	130.0	....
'45	66.9								
'46	73.8	O	102.7	115.2	120.2	123.3	127.5	130.5	....
'47	93.4	N	103.0	115.8	120.5	123.3	127.4	130.6	....
'48	103.0	D	103.8	117.6	120.2	123.5	127.9	131.1	....

This Index combines BLS Wholesale or Primary Price Index of Building Materials, weighted 61.4%, and BLS Index of Average Hourly Earnings in Building Constructon, weighted 38.6%. Weights are based on BLS studies of 1939 projects. No adjustments are made for competitive conditions, productivity or overhead.



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Industrial Equipment Cost Indexes

Marshall & Stevens, Inc. of Chicago, Illinois, 1926 = 100

Industry	1929	1932	1939	1945	1946	1947	1948	1949	1950	1952	1953	1954	6/55
Average of All	**91.9**	**66.1**	**84.8**	**103.4**	**123.2**	**150.6**	**162.8**	**161.2**	**167.9**	**180.5**	**182.5**	**184.6**	**188.1**
Commercial (av. 12*)	91.8	67.6	86.8	105.2	120.9	146.9	158.6	152.7	159.8	170.6	172.6	183.3	187.8
Transportation—garage	91.5	69.2	83.6	100.9	123.9	157.0	171.1	170.3	179.7	195.1	197.0	199.0	202.7
Public util (av. 2*)	91.8	70.1	82.9	97.5	119.5	145.8	159.6	159.7	164.8	176.6	178.8	181.7	184.4
Process (av. 9*)	90.5	73.2	83.6	103.8	123.0	149.1	161.9	161.1	166.6	178.5	180.5	183.4	186.2
Food (av 10*)	92.6	68.5	84.9	104.1	126.1	156.8	169.7	169.2	177.1	190.2	192.4	194.8	198.1
Metal working	92.3	67.9	83.6	110.7	131.2	151.3	161.8	161.8	166.9	178.6	181.0	184.1	186.9
Aircraft	93.0	66.7	85.0	109.8	127.0	162.9	178.3	177.5	186.1	201.7	203.8	205.8	210.7
Mach & parts, elec eq	92.0	68.0	83.4	106.8	130.3	156.6	167.4	167.7	175.0	189.2	191.4	194.6	197.6
Textile	91.1	67.8	83.7	101.8	122.1	146.6	157.4	157.3	165.9	193.3	198.0	199.8	202.8
Woodworking	92.0	67.2	83.6	100.9	123.0	149.6	160.4	160.4	165.5	177.1	172.3	182.3	185.1
General (av. 7*)	95.5	68.8	84.6	103.2	122.0	149.7	162.0	161.8	168.2	180.8	182.6	185.0	188.2
Cold storage—refrig	92 0	70.0	82.1	101.7	125.7	163.2	176.6	175.8	185.2	200.7	202.8	204.8	208.7
Contractors' equipment	91.0	71.9	82.4	102.5	124.2	150.3	161.1	161.1	166.2	177.8	179.9	183.0	185.8

* In each of these groups, **MARSHALL AND STEVENS** reports separate comparative equipment cost trends for: **COMMERCIAL:** Apartment, bank, church, hotel, library, restaurant, school, store, theatre, hospital, dwelling, office **GENERAL:** Laundry, mining and milling, motion picture, printing, shipbuilding, warehouses, logging **PUBLIC UTILITY:** Steam power, electric power **PROCESS:** Distillery, cement, chemical, glass, petroleum indusury, paint, paper, rubber, clay products **FOOD:** Bakery, bottling, brewery, candy, cannery-fish, cannery-fruit, creamery, dairy (flour, cereal feed), packing-fruit, packing-meat

Industrial Building and Equipment Cost Indexes

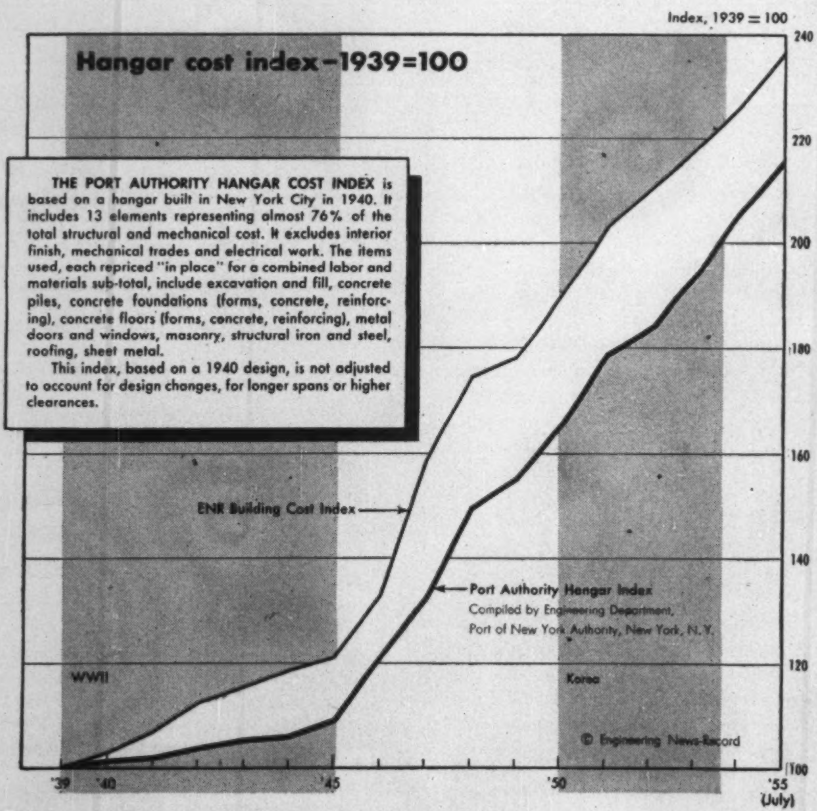
Marshall & Stevens indexes cover both comparative building costs, 1902 to date, and comparative equipment costs, 1913 to date.

The building indexes are national averages with a system of modifiers to get regional and municipal values for each of four types of building. A. Fireproof, protected steel, B. Fireproof, reinforced concrete, C. Masonry buildings, D. Frame. They are designed to reflect normal costs in line with recognized or published prices of building materials, equipment and labor. Extraordinary or intangible conditions are not included. Composite building cost series is converted to 1913 = 100 for table and chart on accompanying page.

Comparative equipment costs, developed to cover the composite of the entire plant, machinery of various kinds, mechanical installation, furniture and fixtures, hand tools and other are combined in proper proportion to their average occurrence in each plant and computed for 47 industries. Eleven series are reproduced here, five of which are averages of 3 or more M&S related series. These are M&S estimates of actual cost paid for installed plant equipment, as a whole.

American Appraisal Index

This index is based on detailed analysis of materials and labor required for four types of buildings (frame, brick, concrete and steel) in 30 representative cities. It is repriced monthly in accordance with: 1. prevailing wage scales and labor performance for the various building trades, and 2. quotations for construction materials in 30 key cities in the United States. The index corrects for labor productivity but assumes normal average conditions and does not give any recognition to overtime or bonus payments to labor or premiums paid for materials in individual cases or under temporary abnormal conditions. It applies to construction only, does not include plumbing, heating, lighting, sprinklers, fixtures and decorations.



THE PORT AUTHORITY HANGAR COST INDEX is based on a hangar built in New York City in 1940. It includes 13 elements representing almost 76% of the total structural and mechanical cost. It excludes interior finish, mechanical trades and electrical work. The items used, each repriced "in place" for a combined labor and materials sub-total, include excavation and fill, concrete piles, concrete foundations (forms, concrete, reinforcing), concrete floors (forms, concrete, reinforcing), metal doors and windows, masonry, structural iron and steel, roofing, sheet metal.

This index, based on a 1940 design, is not adjusted to account for design changes, for longer spans or higher clearances.

Compiled by Engineering Department, Port of New York Authority, New York, N.Y.

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Building Cost Index

American Appraisal Co., Milwaukee, Wis.

30-cities average and 22 individual cities, 1913=100

U. S. Av., 30 cities	'26	'32	'39	'42	'45	'49	'51	'53	'54	Jul '55
	217	**155**	**200**	**241**	**271**	**490**	**532**	**577**	**591**	**611**
Boston	224	169	210	248	270	485	532	581	593	608
New York	234	170	219	248	272	503	545	594	626	629
Buffalo	219	157	205	247	279	506	551	605	619	644
Baltimore	224	166	198	248	277	510	545	585	595	609
Philadelphia	225	161	196	247	275	481	524	572	587	600
Pittsburgh	236	172	219	249	279	486	524	571	582	592
Cincinnati	217	157	209	242	272	477	508	556	571	591
Cleveland	233	160	206	245	268	485	537	577	592	609
Chicago	219	162	205	235	260	452	503	539	550	569
Indianapolis	219	157	206	247	276	501	535	584	606	631
Detroit	224	148	208	252	278	500	549	602	625	649
Milwaukee	218	144	209	254	280	493	558	609	615	630
Minneapolis	197	148	202	235	266	453	493	546	553	578
Kansas City	220	156	209	239	268	469	504	538	554	570
St. Louis	230	163	208	238	265	478	523	569	589	604
Atlanta	211	147	186	240	278	514	558	627	643	664
Dallas	204	146	171	209	246	455	483	527	533	546
New Orleans	217	145	194	234	277	501	533	589	604	626
Denver	204	149	195	226	245	441	480	518	522	541
Seattle	199	141	196	244	277	509	553	574	582	606
San Francisco	188	144	183	225	244	446	491	524	534	568
Los Angeles	195	141	167	213	249	475	517	549	556	595

Boeckh Index of Building Costs

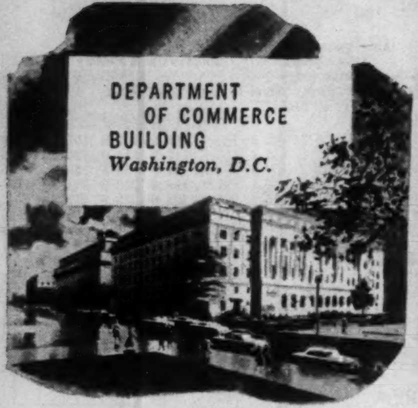
E. H. Boeckh & Assoc., Inc., 1406 M Street, N. W., Washington, D. C.—U. S. average 1926-'29 = 100

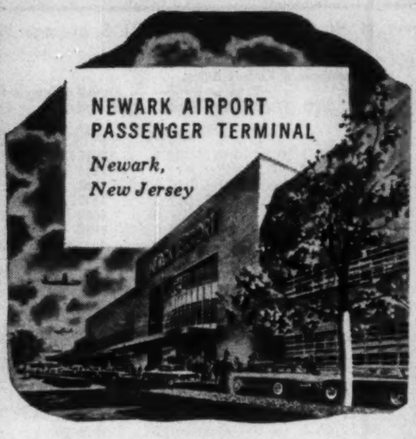
Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs. Brick and			Commercial & Factory Bldgs.		Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
U. S. AVERAGE										
1926–29	101.4	102.5	102.5	102.8	101.3	102.2	100.8	101.7	102.2	104.6
1939	101.2	104.4	104.1	111.2	109.4	101.3	110.4	105.0	112.1	113.3
1946	161.8	161.9	161.7	154.0	154.8	165.6	145.0	158.7	154.8	156.0
1949	213.8	215.6	215.0	208.1	208.4	218.4	195.5	211.9	208.7	211.4
1950	225.9	227.1	226.7	216.5	217.0	231.3	203.2	222.2	217.4	218.8
1954	250.0	255.9	255.3	256.5	252.3	254.4	243.6	254.1	259.9	263.7
June 1955	258.3	263.9	263.1	263.8	259.5	263.8	249.8	261.3	267.3	271.5
ATLANTA AREA										
1926–29	82.7	87.0	84.2	83.7	87.0	82.9	94.5	84.7	87.5	86.8
1939	82.8	86.0	86.1	95.1	95.0	80.6	96.2	88.6	94.6	97.4
1946	149.2	148.1	148.2	136.8	139.9	151.7	130.0	146.8	135.1	136.4
1949	189.9	189.3	189.3	180.6	185.4	191.7	172.7	186.5	177.5	180.8
1950	196.2	194.3	194.7	185.4	191.0	199.3	183.0	190.0	185.0	183.7
1954	219.1	219.6	219.8	223.5	226.2	222.2	225.8	216.0	225.4	225.2
June 1955	224.9	224.3	224.4	227.2	230.5	229.5	229.5	220.4	229.6	220.2
BALTIMORE AREA										
1926–29	107.2	112.0	107.6	100.6	100.7	106.3	95.5	106.8	96.8	101.2
1939	93.5	95.5	95.6	99.3	99.2	94.0	101.7	96.6	101.4	100.2
1946	163.1	161.7	162.2	149.1	150.8	167.6	138.9	158.8	150.0	148.2
1949	216.4	217.4	217.3	204.5	204.8	220.5	191.8	216.6	204.6	208.5
1950	231.0	231.8	232.1	215.0	216.8	234.9	204.2	230.6	217.7	216.5
1954	248.5	252.0	252.4	244.4	244.0	251.8	234.1	251.1	248.9	248.5
June 1955	253.7	256.1	256.5	246.1	246.5	257.6	236.5	253.9	251.1	249.6
BIRMINGHAM AREA										
1926–29	91.7	96.7	94.1	95.5	96.8	90.2	97.5	94.6	96.3	96.3
1939	87.8	90.9	91.5	96.1	96.2	84.9	96.9	95.1	95.6	96.3
1946	149.3	147.4	147.9	137.3	139.4	149.7	128.1	145.4	135.2	137.4
1949	188.2	187.2	187.6	178.9	182.0	192.8	172.6	183.7	177.7	180.0
1950	196.3	196.1	196.8	186.6	189.4	200.6	179.2	193.9	186.2	187.6
1954	216.5	218.8	218.9	218.2	218.4	218.6	212.1	218.8	219.2	223.0
June 1955	221.6	223.7	223.8	222.7	223.0	225.1	217.5	222.5	224.4	227.5
BOSTON AREA										
1926–29	116.3	120.3	115.4	106.2	107.0	118.8	106.3	112.5	108.7	105.8
1939	106.2	110.4	110.1	116.3	113.7	105.7	114.2	111.5	118.2	118.5
1946	167.0	166.5	166.0	156.8	156.6	172.1	147.1	161.1	158.5	160.4
1949	223.0	226.5	225.9	216.7	215.6	227.1	201.3	222.9	218.2	221.9
1950	234.6	237.8	236.8	227.3	225.5	240.3	210.9	231.8	229.8	232.5
1954	255.2	263.0	263.0	261.5	258.1	258.4	250.1	262.1	269.1	270.1
June 1955	266.5	273.6	273.6	272.3	268.6	271.3	260.5	271.6	280.4	281.0
CHICAGO AREA										
1926–29	109.2	114.2	109.8	113.2	100.1	112.9	105.2	105.9	112.0	116.0
1939	110.6	112.5	111.1	123.6	118.7	114.2	117.6	109.3	122.6	127.6
1946	168.3	166.0	164.2	158.9	156.9	168.1	144.5	157.4	157.0	162.5
1949	219.2	218.3	216.1	210.6	208.7	229.1	193.3	207.7	210.4	215.1
1950	231.9	229.7	227.4	217.8	216.8	243.4	201.2	216.5	219.5	222.6
1954	262.9	265.0	262.2	267.3	259.4	274.7	246.6	252.6	268.0	277.0
June 1955	270.4	272.1	269.3	274.2	266.6	283.0	253.4	258.6	275.2	283.9
CINCINNATI AREA										
1926–29	100.5	105.0	101.3	101.0	100.2	100.2	99.6	103.1	100.6	101.0
1939	103.3	106.2	105.9	113.9	110.4	103.3	111.7	107.1	113.7	116.5
1946	165.6	166.3	166.7	154.5	154.7	167.5	140.7	166.4	154.4	156.1
1949	214.1	216.6	215.8	207.5	206.0	217.9	193.5	214.1	208.4	212.2
1950	220.3	224.1	223.1	213.9	211.7	224.3	199.1	220.4	215.6	218.7
1954	247.9	256.8	255.5	257.9	250.1	251.0	239.9	258.6	260.5	267.7
June 1955	255.7	264.8	263.4	266.3	257.7	259.7	246.5	266.6	269.3	276.8
CLEVELAND AREA										
1926–29	107.2	113.4	108.5	111.3	108.3	109.0	103.0	107.2	110.5	114.8
1939	106.2	109.6	109.5	115.3	112.8	107.5	112.9	109.5	117.7	118.0
1946	169.2	169.4	168.7	160.2	159.9	174.1	146.4	164.3	161.0	165.9
1949	224.8	225.7	223.6	216.0	213.0	233.0	198.5	218.0	217.2	220.9
1950	237.9	237.8	235.4	227.8	224.1	248.1	207.2	227.6	228.4	232.3
1954	264.8	270.3	268.0	271.9	263.2	274.6	251.6	263.4	276.1	282.1
June 1955	275.3	281.6	278.9	282.5	272.6	285.7	259.2	274.5	286.5	293.6
DALLAS AREA										
1926–29	103.1	107.3	103.2	98.9	99.1	103.6	100.5	100.9	99.4	99.7
1939	95.1	95.8	96.7	98.8	100.2	94.8	106.6	96.0	101.9	98.9
1946	150.2	148.8	149.4	139.8	144.4	153.5	140.3	144.6	142.6	141.1
1949	207.2	206.2	206.9	197.1	201.3	210.3	197.1	203.2	201.5	195.4
1950	220.5	221.2	222.1	209.0	212.5	221.3	206.3	218.6	210.1	208.3
1954	235.6	237.6	239.0	237.4	235.3	237.4	246.7	236.0	245.4	238.7
June 1955	239.0	240.9	241.8	241.4	243.1	242.4	249.7	237.8	248.9	243.2
DENVER AREA										
1926–29	95.0	99.7	95.5	102.4	99.6	95.5	105.5	94.6	101.4	108.0
1939	112.1	112.0	111.2	116.1	114.4	114.3	118.7	109.5	117.0	117.8
1946	160.1	160.3	150.4	155.3	157.9	164.0	155.6	156.8	160.0	158.3
1949	212.9	215.8	215.9	211.0	213.1	216.2	207.0	214.3	214.6	215.3
1950	228.2	230.0	229.8	218.8	221.2	232.4	212.3	226.2	221.2	221.3
1954	252.0	258.9	258.6	259.1	257.1	254.3	252.8	259.3	263.4	266.2
June 1955	262.4	267.9	267.2	266.1	264.1	265.9	257.1	266.2	269.6	273.2
DETROIT AREA										
1926–29	103.3	108.4	104.3	102.9	102.4	103.7	103.1	103.5	103.3	104.4
1939	98.8	102.7	102.9	108.6	107.5	98.7	108.8	104.2	111.4	110.1
1946	165.9	165.9	165.8	157.4	157.9	171.3	147.5	160.9	160.0	159.7
1949	221.0	222.6	221.9	212.2	211.5	227.0	196.8	216.8	214.2	215.9
1950	233.0	234.0	233.3	222.8	222.0	240.0	208.1	227.1	226.0	225.7
1954	262.8	269.2	267.7	271.4	264.0	270.5	253.6	264.0	276.1	281.0
June 1955	273.3	279.9	278.0	281.4	272.3	282.5	261.1	273.7	286.1	292.4
KANSAS CITY AREA										
1926–29	100.3	106.5	102.2	105.7	103.3	101.1	105.9	101.9	107.5	108.8
1939	104.4	109.9	109.8	118.3	115.4	103.8	117.2	113.0	120.0	121.6
1946	166.5	165.6	165.4	158.2	159.5	172.3	151.0	159.8	159.3	160.3
1949	215.9	216.7	216.3	209.0	211.1	221.8	199.4	210.0	211.3	211.5
1950	230.5	229.6	228.7	216.0	218.8	238.1	203.6	219.6	217.7	217.8
1954	255.5	260.7	260.2	257.1	253.8	261.3	244.6	256.6	260.5	266.6
June 1955	261.8	266.7	265.8	263.3	260.3	269.0	251.0	261.5	267.6	272.1
LOS ANGELES AREA										
1926–29	92.7	97.9	93.5	98.8	96.8	93.5	97.0	91.3	97.5	103.1
1939	93.6	97.2	97.5	103.7	105.0	95.6	109.5	96.8	106.2	104.9
1946	155.1	156.1	156.2	155.3	156.7	160.1	158.3	150.9	160.0	158.7
1949	203.2	207.0	206.0	209.9	210.7	205.3	201.2	201.8	210.2	212.4
1950	222.8	224.1	223.4	217.4	219.2	227.8	205.5	215.4	217.5	219.0
1954	245.3	251.0	250.0	257.7	254.9	251.0	249.8	245.3	261.8	265.7
June 1955	258.6	264.0	262.6	270.3	265.8	265.8	258.8	256.6	273.0	279.2
MINNEAPOLIS AREA										
1926–29	92.8	98.2	94.6	95.6	96.1	92.8	100.0	93.9	97.9	98.4
1939	101.9	105.0	104.2	113.5	110.7	102.7	113.4	103.6	114.5	117.2
1946	163.7	167.0	167.5	156.5	155.7	164.9	142.6	168.2	157.2	159.5
1949	218.7	218.7	217.7	205.1	206.9	224.4	192.6	211.7	205.8	208.0
1950	228.2	227.9	227.0	210.1	213.2	234.4	198.2	220.3	215.6	211.3
1954	256.1	263.6	262.8	257.1	253.4	259.8	242.1	264.3	261.7	266.1
June 1955	266.2	273.5	272.3	267.6	263.1	270.7	249.6	272.5	271.4	277.3
NEW ORLEANS AREA										
1926–29	93.3	96.3	93.4	86.5	90.6	93.3	93.7	91.5	89.5	86.5
1939	89.0	90.3	91.3	95.4	98.3	88.1	102.8	91.7	98.5	94.9
1946	148.9	147.7	148.2	138.6	142.8	151.2	138.7	145.4	142.0	138.7
1949	201.6	201.4	202.0	188.8	194.6	204.9	186.0	200.0	191.8	189.8
1950	211.7	210.3	211.0	196.2	203.1	215.8	194.4	206.4	199.5	195.3
1954	231.0	233.1	233.7	228.9	233.2	234.3	225.2	232.1	232.8	231.5
June 1955	237.6	239.8	240.2	237.1	240.7	241.7	232.1	238.0	240.2	238.9
NEW YORK CITY AREA										
1926–29	133.3	138.4	131.9	122.8	120.4	137.5	113.1	127.4	123.2	125.3
1939	122.1	123.3	122.5	130.6	125.9	125.6	123.7	119.6	130.0	133.3
1946	182.4	181.8	181.1	177.2	174.6	188.1	158.6	177.4	174.8	179.0
1949	240.8	243.7	242.7	242.8	238.2	247.5	217.3	238.3	240.0	246.4
1950	254.5	256.2	255.2	249.5	246.1	262.1	224.2	249.7	248.0	251.5
1954	278.2	285.0	284.3	293.0	284.5	284.6	271.3	280.7	295.4	300.6
June 1955	283.7	290.6	289.6	295.3	286.7	289.9	271.9	286.7	297.0	303.6
PHILADELPHIA AREA										
1926–29	100.3	106.3	103.7	105.9	103.1	98.1	101.9	104.2	104.1	107.5
1939	99.2	102.6	102.9	105.7	104.1	98.2	102.0	105.0	105.5	106.7
1946	165.0	163.9	164.9	153.2	154.6	169.0	141.2	161.1	152.7	154.0
1949	220.5	220.6	220.3	209.0	209.0	224.3	190.3	216.3	205.6	209.9
1950	234.4	235.1	234.8	221.2	220.7	239.3	202.0	230.5	218.8	222.8
1954	261.9	268.0	267.1	264.4	258.0	265.2	238.9	268.0	262.0	271.1
June 1955	271.8	277.6	276.7	272.2	265.2	276.0	245.8	276.9	270.5	279.1
PITTSBURGH AREA										
1926–29	113.3	118.8	112.8	111.2	107.1	115.4	89.6	112.2	104.6	112.9
1939	113.8	117.0	115.7	117.5	114.2	114.2	109.8	116.5	116.9	119.1
1946	169.5	169.0	168.0	156.6	155.3	173.5	140.1	166.4	153.2	158.9
1949	227.1	229.1	227.7	215.6	212.2	231.3	186.9	227.0	209.8	219.8
1950	237.6	238.6	237.6	222.2	219.8	242.6	196.6	235.3	218.9	224.2
1954	263.9	270.6	269.6	264.5	258.2	267.8	238.9	271.4	265.0	271.4
June 1955	271.0	277.2	275.9	269.5	263.1	275.8	243.3	276.8	269.8	276.1
ST. LOUIS AREA										
1926–29	118.6	121.1	115.7	109.9	108.8	121.3	103.3	111.7	107.7	109.3
1939	107.0	110.2	109.9	118.7	116.4	107.6	114.3	110.3	119.2	119.8
1946	167.4	167.1	166.2	159.1	158.9	171.7	145.3	154.8	158.1	161.1
1949	220.7	221.4	220.7	212.8	212.4	226.8	197.5	217.3	213.6	215.7
1950	230.7	232.8	233.7	221.9	220.9	240.1	204.7	229.5	222.8	225.3
1954	257.9	264.6	263.4	263.7	256.8	263.6	244.8	263.1	266.2	273.3
June 1955	267.4	274.0	272.9	272.2	265.3	274.1	252.2	272.5	276.0	281.8
SAN FRANCISCO AREA										
1926–29	87.7	93.7	90.4	97.5	96.5	86.1	95.5	91.8	95.9	99.0
1939	99.2	105.7	104.5	117.4	114.4	97.6	114.9	107.4	116.5	121.9
1946	157.5	159.7	160.0	157.9	159.0	160.5	151.5	158.4	160.0	159.3
1949	207.1	213.0	212.8	214.0	213.9	210.0	203.9	213.9	216.1	219.8
1950	223.1	227.0	226.8	222.4	222.9	226.1	209.1	224.5	222.6	224.5
1954	249.2	257.4	256.6	264.1	259.3	253.0	250.4	256.7	267.2	272.5
June 1955	261.9	270.2	269.2	275.8	269.6	267.5	259.9	269.2	278.8	286.1
SEATTLE AREA										
1926–29	84.5	92.2	89.2	101.7	95.1	82.4	100.8	92.2	100.5	105.9
1939	96.7	104.4	103.8	119.2	114.9	94.4	115.1	108.3	118.7	125.3
1946	152.9	158.3	157.9	161.2	159.8	154.3	156.0	158.9	164.2	167.1
1949	203.9	214.3	214.0	220.7	218.1	205.2	209.9	218.0	225.3	228.5
1950	213.6	224.1	224.0	227.1	224.7	214.3	214.1	227.8	230.3	234.5
1954	236.1	253.3	253.2	266.6	259.5	234.6	253.5	262.6	274.0	279.1
June 1955	243.7	260.3	260.3	272.5	265.7	242.9	259.7	268.5	280.5	285.2
WASHINGTON, D. C.										
1926–29	106.6	107.7	107.9	107.1	105.9	106.0	104.0	108.0	106.4	108.4
1946	168.5	166.2	167.1	157.1	158.2	173.6	145.2	162.6	157.2	156.6
1949	223.1	223.3	223.1	213.5	212.6	227.2	194.8	218.6	210.4	214.6
1950	235.0	233.7	233.8	223.2	224.5	240.5	210.2	227.5	223.8	222.0
1954	254.4	256.6	257.4	255.4	253.2	260.2	245.3	252.7	259.4	260.0
June 1955	262.2	263.3	264.0	260.2	258.6	269.2	250.5	258.0	264.6	264.3

Current indexes are calculated upon an actual survey at source of local construction cost conditions. Material prices used are those paid by contractors to material dealers.

Labor rates are current rates paid by contractors — certain corrections being made in certain areas for labor efficiency and labor shortage. Index includes construction overhead sales taxes, compensation insurance and social security. The indexes have been primarily, engineered to use as local cost conversion factors to construction cost data released by the Boeckh organization. Complete formula is published in "Boeckh's Index Calculator Table."

Where Boeckh Index is shown in these pages on charts or tables for comparison with other building cost indexes, the "National" average for all five Boeckh commercial and factory building indexes in 20 (of 47) U. S. cities is used, converted to 1913 = 100.


DEPARTMENT
OF COMMERCE
BUILDING
Washington, D.C.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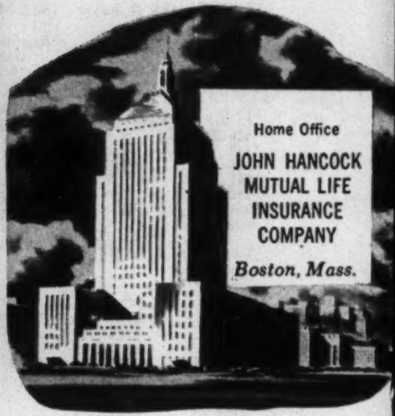
PASSENGER TERMINAL
*Newark,
New Jersey*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JOHN HANCOCK
MUTUAL LIFE
INSURANCE
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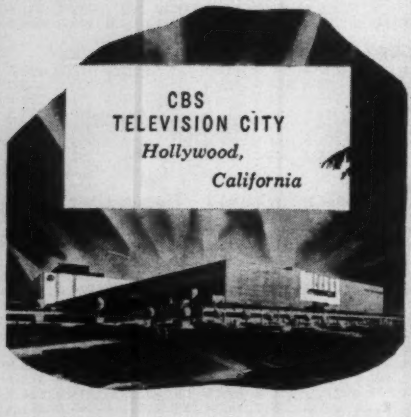
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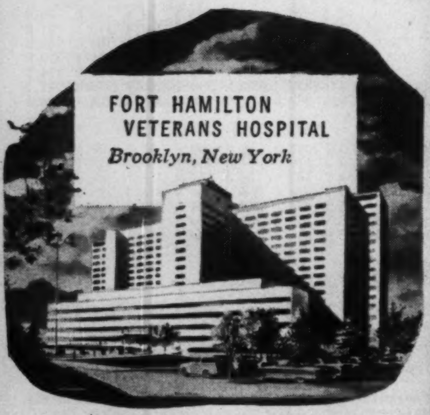
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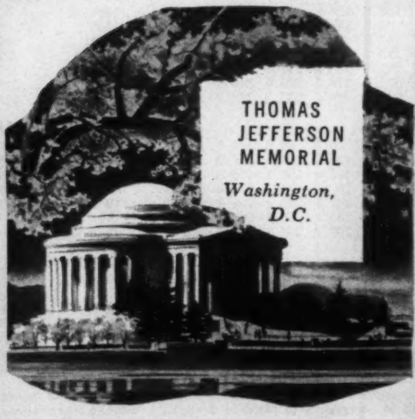
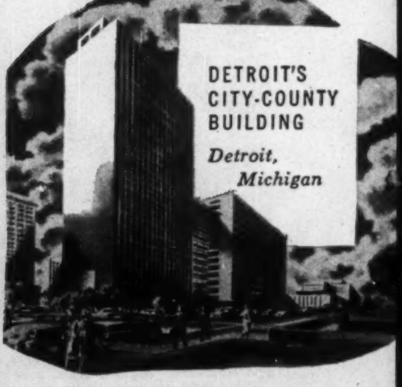
VETERANS HOSPITAL
Brooklyn, New York


THOMAS
JEFFERSON
MEMORIAL
*Washington,
D.C.*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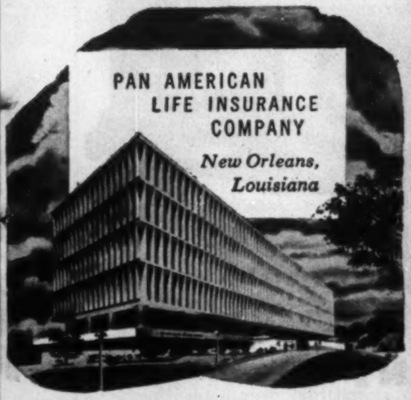

PAN AMERICAN
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COMPANY
New Orleans,
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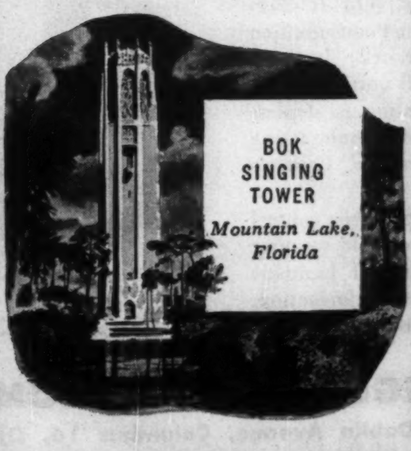
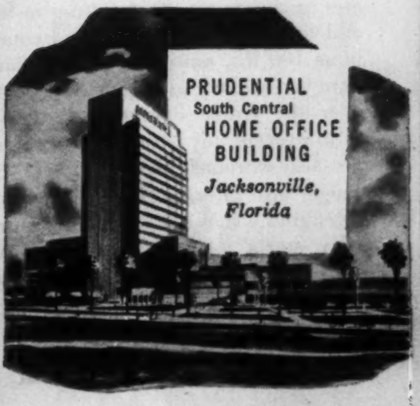


BOK
SINGING
TOWER
Mountain Lake,
Florida



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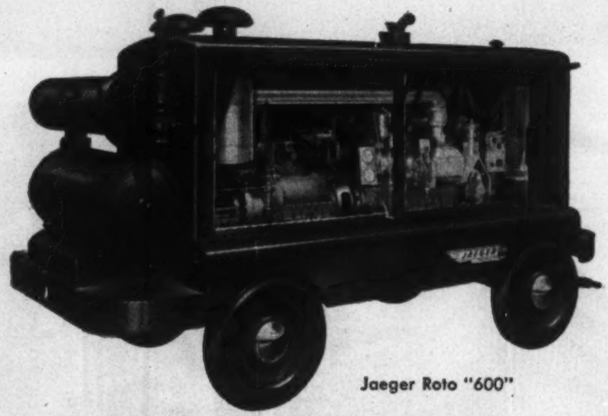

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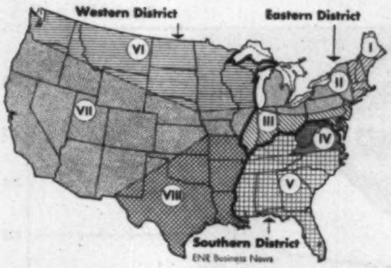


Railroad Cost Index Road Construction

Interstate Commerce Commission —1910-14 = 100

Dist & Reg.	%	1926	1932	1939	1945	1949	1953	1954
1 to VIII	**68.40**	**166**	**131**	**137**	**197**	**270**	**319**	**320**
I East	73.72	173	134	140	206	287	333	332
II East	66.47	168	133	141	202	283	330	333
III East	65.37	168	132	144	205	286	335	334
IV South	63.48	163	126	131	195	259	310	311
V South	68.79	164	129	136	195	265	315	317
VI West	72.27	164	129	132	190	253	307	309
VII West	68.79	166	131	133	188	256	306	308
VIII West	71.97	167	133	140	198	270	316	321

Indexes represent territorial index factors and are not for determining unit reproduction costs for individual roads.

By Accounts	1926	1932	1939	1945	1949	1953	1954
Engineering	166	131	137	197	270	319	320
Other rt of way exp.	159	121	135	201	258	309	281
Grading	153	106	90	144	139	154	144
Tunnels & subways	178	119	140	236	339	379	367
Brdg. culv & trestl	170	122	149	240	374	434	418
Elevated structures	165	129	149	249	382	468	450
Ties	173	144	158	241	302	358	360
Rails	144	140	136	152	245	311	326
Other track material	177	163	167	176	278	331	351
Ballast	175	146	143	181	254	288	312
Trk laying & surf	188	164	165	273	366	427	443
Fences snw sheds	178	147	140	189	279	343	340
Stat & off bldgs	184	141	166	244	368	438	442
Roadway buildings	187	140	162	258	386	439	443
Water stations	182	147	166	227	327	379	384
Fuel stations	180	144	159	242	357	415	421
Shops & eng houses	185	137	165	248	379	446	450
Grain elevators	190	137	164	236	367	437	440
Storage warehouses	189	137	166	253	377	452	458
Wharves & docks	177	136	153	255	350	404	402
Coal & ore, wharves	174	136	153	236	341	395	388
Tel & tel lines	157	121	129	173	250	315	317
Sgnls & intrlocks	169	130	143	176	226	290	296
Power plants	186	138	167	246	386	472	477
Powr trnsmissn sys	176	143	148	180	266	331	338
Misc struct	186	141	161	229	378	445	449
Roadway mach	151	138	154	187	270	332	333
Roadway small tools	190	155	180	200	315	400	416
Public impr const	169	131	142	217	321	358	347
Shop mach	186	155	202	236	324	387	386
Power plant mach	186	155	180	191	242	297	300
Work equipment	180	165	200	254	348	422	427

Ratio of RR costs, 1954

Road construction	66.66
Equipment, work	0.54
Equipment, rolling & floating	26.38
General	6.42
Total	100.00

Indexes released August 1955, by Engineering Sect. Bu. of Accounts, Cost Finding and Valuation, Interstate Commerce Commission, include items developed from analysis of major construction contracts over a period of years. Indexes for material accounts are based on studies of carriers' returns to Valuation Order 14, joint studies made with various sub-committees of President's Conference Committee, engineering publications, contracts covering major construction projects and information furnished by individual carriers.

Handy-Whitman Index—Public Utility Costs

Whitman, Requardt and Associates, Baltimore, Md.

Individual series for 103 cost elements in three classes of utility construction, for six geographic divisions of the United States, are reported semi-annually. Weighting is based on wide experience in cost analysis of plants and construction. Material prices are from ENGINEERING NEWS-RECORD, Iron Age and various manufacturers; labor rates from BLS, unions and builders associations.

Building construction—1911 to 1914 = 100

(Complete Index reports 14 Items entering into Building Construction Costs.)
A relates to Reinforced Concrete Bldg.; B relates to Brick Bldg.

	Jan. '26	July '26	Jan. '32	July '32	Jan. '39	July '39	Jan. '42	July '42	Jan. '45	July '45	Jan. '49	July '49	Jan. '50	July '50	July '51	July '52	Jan. '53	July '53	Jan. '54	July '54	Jan. '55	July '55
North Atlantic Division																						
A	213	213	171	159	205	207	250	253	259	260	436	433	437	448	479	485	496	519	526	534	540	547
B	228	229	189	173	211	214	246	250	262	265	429	421	424	436	474	479	485	503	511	523	525	527
South Atlantic Division																						
A	213	215	171	164	204	205	260	267	274	275	462	453	465	469	510	517	527	556	562	569	578	587
B	226	228	185	176	209	211	255	262	272	277	431	431	434	439	485	488	494	516	524	536	543	551
North Central Division																						
A	203	201	169	154	200	200	237	242	249	253	421	418	423	437	468	481	492	520	519	526	533	542
B	212	211	181	164	203	203	229	234	248	250	389	390	394	408	440	453	459	483	487	497	503	513
South Central Division																						
A	192	191	149	144	188	187	232	236	242	243	411	412	418	422	454	460	471	494	499	504	508	515
B	203	204	160	154	191	191	223	227	235	238	382	382	387	392	424	438	445	460	466	474	478	486
Plateau Division																						
A	198	197	153	149	194	194	230	235	238	239	402	397	400	417	451	456	471	480	479	495	499	506
B	211	210	167	163	199	200	221	227	231	233	396	395	396	410	442	447	458	464	465	481	485	492
Pacific Division																						
A	191	190	157	148	192	192	238	241	248	248	416	415	420	432	463	468	477	501	501	518	524	529
B	198	197	164	156	193	193	226	231	241	242	386	385	389	400	435	443	448	466	465	479	488	498

Gas plant construction—1911 = 100

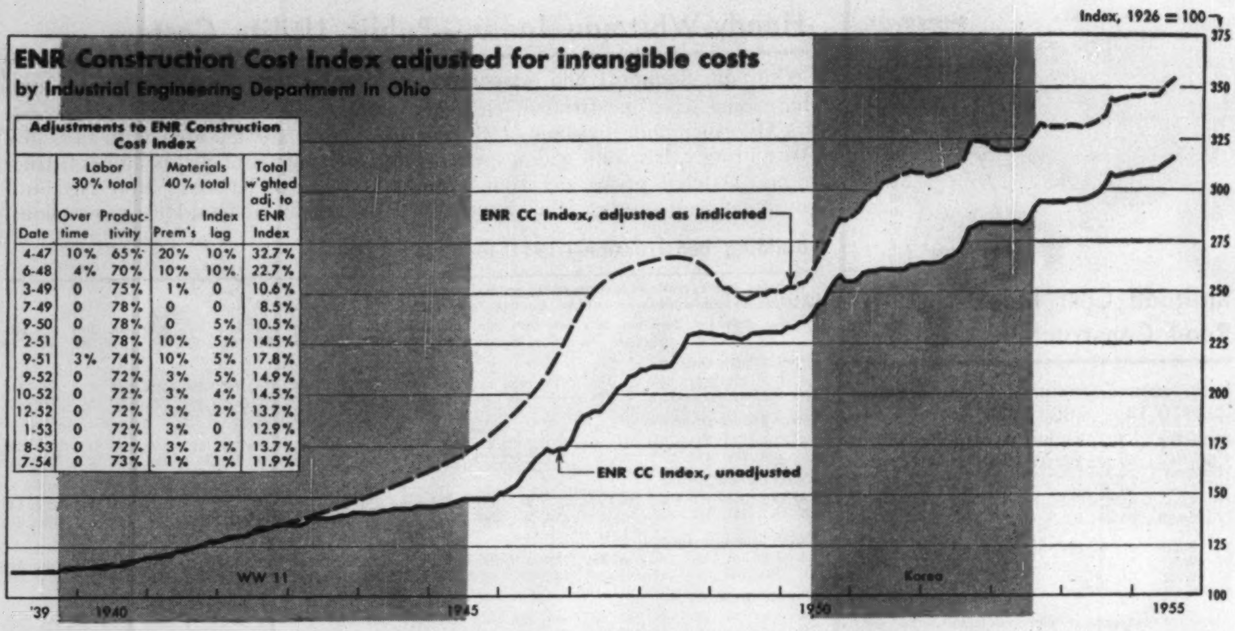
(Complete Index reports 25 Items entering into Gas Plant Construction Costs.)
A relates to Total Constr. & Equip.; B relates to Mech. Equip. Exclusive of Gas Holders

	Jan. '26	July '26	Jan. '32	July '32	Jan. '39	July '39	Jan. '42	July '42	Jan. '45	July '45	Jan. '49	July '49	Jan. '50	July '50	July '51	July '52	Jan. '53	July '53	Jan. '54	July '54	Jan. '55	July '55
North Atlantic Division																						
A	230	230	202	188	241	249	272	275	283	288	469	464	467	476	519	536	540	561	577	589	600	605
B	212	212	209	195	274	278	297	299	296	301	447	481	479	485	549	554	567	590	606	609	615	615
South Atlantic Division																						
A	219	222	178	175	227	230	261	268	278	282	464	453	456	457	507	520	525	543	560	568	581	591
B	212	212	209	195	274	278	297	299	296	301	481	482	479	485	549	554	567	590	606	609	615	615
North Central Division																						
A	217	218	198	178	232	232	249	254	264	269	435	434	437	447	489	503	508	531	545	554	565	572
B	212	212	209	195	274	278	297	299	296	301	447	481	479	485	549	554	567	590	606	609	615	615
South Central Division																						
A	199	200	171	160	216	217	244	249	258	261	420	419	425	429	470	475	479	496	510	522	532	538
B	212	212	209	195	274	278	297	299	296	301	447	487	479	485	549	554	567	590	606	609	615	615
Plateau Division																						
A	202	202	176	166	216	217	232	237	240	243	403	398	401	405	449	460	467	476	480	501	511	517
B	212	212	209	195	274	278	297	299	296	301	447	481	479	485	549	554	567	590	606	609	615	615
Pacific Division																						
A	205	206	187	177	227	228	253	257	264	266	433	428	433	437	480	494	498	516	529	544	555	561
B	212	212	209	195	274	278	297	299	296	301	447	481	479	485	549	554	567	590	606	609	615	615

Electric light and power construction—1911 = 100

(Complete Index reports 64 Items entering into Electric Light and Power Construction Costs.)
A relates to Total Constr. & Equip. All Steam; B to Accessory Electric Equipment; C to Sub-sta. Equip.

	Jan. '26	July '26	Jan. '32	July '32	Jan. '39	July '39	Jan. '42	July '42	Jan. '45	July '45	Jan. '49	July '49	Jan. '50	July '50	July '51	July '52	Jan. '53	July '53	Jan. '54	July '54	Jan. '55	July '55
North Atlantic Division																						
A	197	194	182	176	224	225	248	248	251	259	401	400	399	409	468	480	481	506	509	517	519	524
B	197	196	192	186	225	224	241	239	226	237	340	341	341	360	420	430	426	457	457	460	461	468
C	184	178	172	168	203	203	217	216	207	218	306	312	312	320	359	366	365	392	392	396	396	400
South Atlantic Division																						
A	201	201	188	180	232	233	262	267	268	273	430	422	422	430	490	504	506	536	539	547	551	559
B	200	203	200	191	239	240	260	262	247	248	357	356	358	374	431	442	438	474	474	482	485	494
C	187	183	180	173	217	218	235	237	227	228	322	325	327	333	370	377	377	409	409	417	419	425
North Central Division																						
A	190	187	186	174	219	218	235	238	238	243	375	374	374	382	443	456	458	489	488	495	498	504
B	189	188	199	186	224	223	229	231	216	218	309	307	310	324	382	391	388	419	418	424	425	432
C	178	171	181	169	203	202	207	209	198	200	278	280	282	286	326	333	332	359	359	364	365	369
South Central Division																						
A	184	183	179	171	218	218	245	246	248	251	391	390	390	398	454	465	468	496	498	506	508	515
B	187	189	200	190	231	230	250	248	235	235	341	340	340	357	415	423	420	453	454	460	462	470
C	175	171	181	173	210	209	226	226	217	217	310	311	311	319	352	356	356	385	386	392	394	398
Plateau Division																						
A	190	188	177	171	218	219	234	236	238	241	378	378	376	386	443	454	460	482	484	493	495	500
B	197	196	194	188	231	232	237	236	225	225	322	323	323	341	399	408	407	437	435	440	441	446
C	185	177	175	171	209	211	213	212	207	207	289	294	294	302	341	347	348	374	374	378	378	381
Pacific Division																						
A	180	178	172	163	216	215	235	242	242	244	383	380	379	389	450	459	461	486	487	495	499	503
B	178	177	182	170	222	222	231	240	225	225	328	323	323	343	408	413	409	437	436	438	440	447
C	167	161	164	155	203	202	210	219	208	208	298	297	297	307	357	359	358	382	382	384	385	390



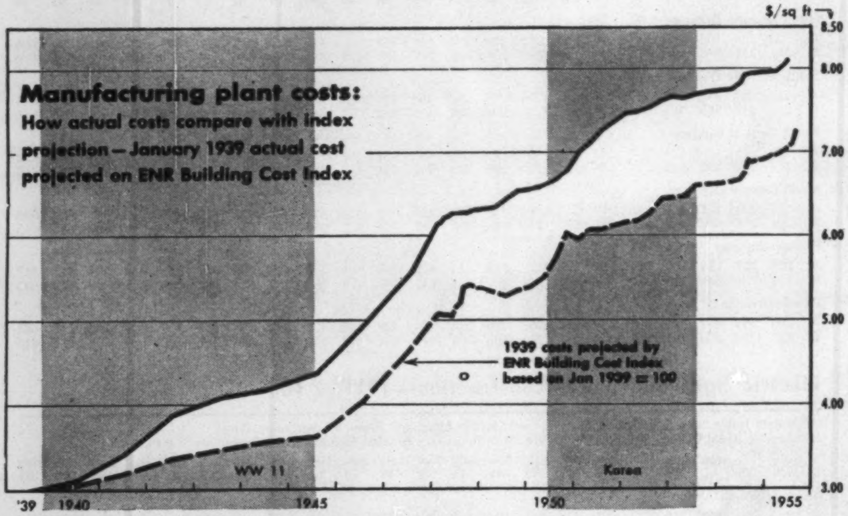
ENR Construction Cost Index adjusted for intangible costs
by Industrial Engineering Department in Ohio

Adjustments to ENR Construction Cost Index

Date	Labor 30% total		Materials 40% total		Total w'ghted adj. to ENR Index
	Over time	Productivity	Prem's	Index lag	
4-47	10%	65%	20%	10%	32.7%
6-48	4%	70%	10%	10%	22.7%
3-49	0	75%	1%	0	10.6%
7-49	0	78%	0	0	8.5%
9-50	0	78%	0	5%	10.5%
2-51	0	78%	10%	5%	14.5%
9-51	3%	74%	10%	5%	17.8%
9-52	0	72%	3%	5%	14.9%
10-52	0	72%	3%	4%	14.5%
12-52	0	72%	3%	2%	13.7%
1-53	0	72%	3%	0	12.9%
8-53	0	72%	3%	2%	13.7%
7-54	0	73%	1%	1%	11.9%

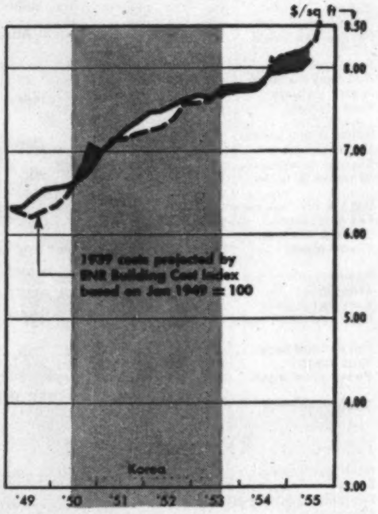
Addition to General Purpose Index Converts it to a Special Purpose Index

To adapt a basic general purpose cost index to its needs, a big industrial company in Ohio superimposes on the Engineering News-Record Construction Cost Index an additional component to cover the "invisible" or "intangible" costs described above. The method used is shown in the accompanying chart.



Manufacturing plant costs:
How actual costs compare with index projection—January 1939 actual cost projected on ENR Building Cost Index

Walter Kidde Constructors, New York, N. Y



Manufacturing Plant Cost Index—1939=$3/sq ft

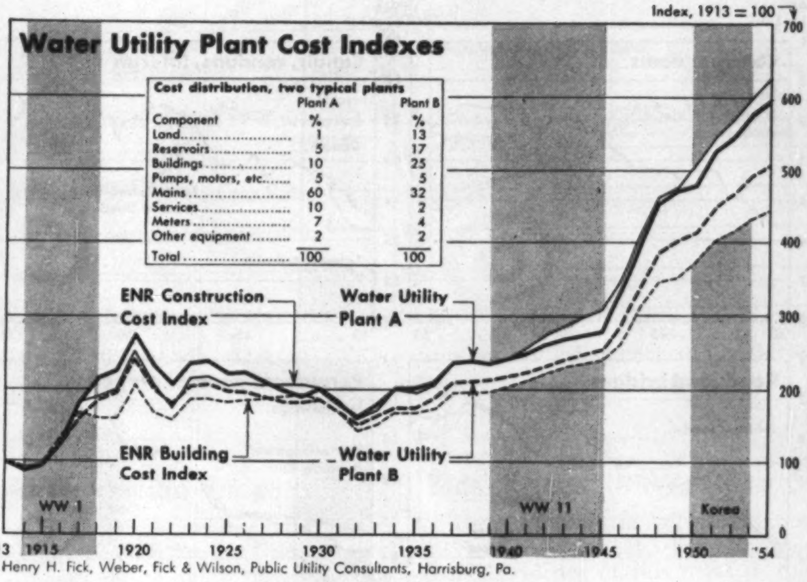
This special purpose cost index is based on the unit "actual cost," $3 per sf in 1939, of an average standard manufacturing plant. Every plant built has its own characteristics which affect its cost, thus cost estimates or accounts for different plants do not measure accurately the direction and degree of cost and price movements.

So the same plant is repriced here to represent experience in the metropolitan New York and New Jersey areas. Costs include overhead, insurance, taxes, overtime, construction equipment use and other "invisible" costs that must be covered in the selling price. Holding these to a minimum, plus shrewd buying, good labor relations and direction are functions of management and "productivity."

To test the effects of these "invisibles" on actual costs, the 1939 base price has been projected by use of the Engineering News-Record Building Cost Index which measures only the trend in cost of labor and materials.

Note in the chart at the right how improved productivity is pulling the actual costs across and below the curve that measures the movement in materials prices and wage rates including fringe benefits. The highly competitive situation in 1954 should hold this actual cost curve below the building cost index projection.

This "actual vs. theoretical" cost comparison is made available by E. Warren Bowden, vice president, Walter Kidde Constructors, Inc., New York.



Cost distribution, two typical plants

Component	Plant A %	Plant B %
Land	1	13
Reservoirs	5	17
Buildings	10	25
Pumps, motors, etc.	5	5
Mains	60	32
Services	10	2
Meters	7	4
Other equipment	2	2
Total	100	100

Henry H. Fick, Weber, Fick & Wilson, Public Utility Consultants, Harrisburg, Pa.

Indexes Used to Develop Fick Waterworks Property Component Cost Indexes

	Indexes, 1913=100								
Building	1926	1932	1939	1940	1949	1953	Dec. 1953	1954	Dec. 1954
Engineering News-Record Building Cost Index	185.0	140.9	197.4	202.8	351.8	430.9	435.9	445.7	456.8
E. H. Boeckh & Assoc brick & concr comm & factory bldg, Pittsburgh, Pa area	210.3	161.7	223.9	224.2	413.2	495.3	507.9	510.2	514.1
ICC Railroad constr index, station & office buildings, Group III (1910–14=100)	184.0	141.0	166.0	177.0	368.0	438.0	.....	.....	.....
Handy-Whitman brick buildings index, North Atl. Div.	229.0	175.3	214.0	218.3	423.8	500.5	511.0	520.5	525.0
Materials									
6-in & larger cast-iron pipe, based on Iron Age index, New York City	215.0	130.1	213.1	223.4	421.3	491.0	494.2	494.2	494.2
3-in & under steel pipe, private sources*	187.5	171.9	155.4	155.4	249.7	313.6	322.0	328.0	334.3
Motors, based on Handy-Whitman index, North Atlantic Div.	134.2	134.0	147.8	147.0	232.0	308.5	317.0	317.0	317.0
Contractors' equipment, based on Marshall & Stevens index	158.7	114.1	130.8	132.4	255.7	282.2	290.8	290.5	289.7
Office equipment, based on Marshall & Stevens index.	136.8	101.1	123.5	127.2	220.9	251.0	252.3	252.7	252.3
Meters, private sources	162.5	162.5	147.7	147.7	265.9	317.7	332.7	332.7	332.7
Common Labor, based on Engineering News-Record labor index, 20-city average	288.4	224.7	359.5	367.9	763.2	985.3	1,017.4	1,044.2	1,064.2
Construction, based on Engineering News-Record Construction Cost Index	208.0	157.0	235.5	242.0	477.0	600.1	611.5	628.0	643.3
Gas utility costs, based on Handy-Whitman index North Atlantic, Div	212.0	174.5	229.6	235.2	432.9	518.3	534.3	545.2	555.6

* Replaces wrought iron pipe in the SERVICES INDEX 1913 to date (see table, upper right)

Petroleum Refinery Construction Cost Index

Compiled by W. L. Nelson, Petroleum Refinery Engineering Consultant, published by Oil & Gas Journal, Tulsa, Oklahoma—1946 = 100

	1926	1932	1939	1942	1945	1948	1949	1950	1951	1952	1953	1954	June 1955
NELSON Refinery Construction Index=1946=100	*72.0	*56.6	*76.6	*83.7	*89.9	132.5	139.7	146.2	157.2	163.6	173.5	179.8	182.1
EQUIPMENT													
Heat exchangers	75.0	60.0	76.0	93.5	91.9	130.0	133.0	140.0	152.0	165.8	174.9	171.7	153.4
Instruments (control)	....	90.0	89.5	85.5	90.6	120.0	122.0	127.8	142.3	146.2	151.8	154.6	162.9
Pumps, compressors, etc.	....	....	91.5	87.5	93.9	127.0	135.9	138.2	155.9	155.6	162.5	166.5	170.4
Electrical equipment	81.0	57.0	68.5	74.0	81.8	127.6	130.9	134.9	154.3	152.4	156.4	160.0	160.3
Internal combustion engines	....	....	84.5	84.5	91.7	116.9	124.8	126.0	146.1	146.5	148.1	150.5	149.9
Miscellaneous equipment average	*94.0	*79.0	*82.0	*85.0	*90.0	†122.1	†121.6	†126.2	†145.1	153.3	158.8	160.7	159.4
MATERIALS	....	68.0	82.0	86.3	89.7	139.3	143.6	149.5	164.0	164.3	172.4	174.6	171.2
LABOR	....	49.0	73.0	82.0	90.0	128.0	137.1	144.0	152.5	163.1	174.2	183.3	189.3

* Approximate, projection back to these dates from other cost sources.
† Used to compute index until Apr 1952. Slightly different from the average of the miscellaneous equipment items shown

Equipment prices, mainly from manufacturers as quoted to Oil & Gas Journal *Materials Component from Bureau of Labor Statistics Wholesale Price Index, Code 10-1 Iron and Steel and Code 13, Building Materials *Labor, half skilled and half common labor as quoted by Engineering News-Record. For base costs see ENR Oct. 8, 1953, p. 115

Waterworks Property Cost Index Components–1913=100

Henry H. Fick, Weber, Fick & Wilson, Public Utility Consultants, Harrisburg, Pa.

Year	Reservoirs	Buildings	Pumps and Motors	Distribution System	Services*	Meters	Other Equipment
1926	208.0	210.3	134.2	237.0	230.9	175.0	147.0
1932	157.0	161.7	134.0	158.5	194.6	168.7	107.1
1939	235.5	223.9	147.8	257.0	243.2	168.8	126.9
1940	242.0	224.2	147.0	266.8	246.8	169.7	129.7
1941	257.8	229.9	147.0	273.7	256.8	189.8	140.0
1942	276.3	239.8	154.0	283.3	270.6	201.9	151.6
1943	289.9	247.9	154.0	291.1	281.6	204.5	152.5
1944	298.7	261.8	145.8	295.2	287.5	205.9	154.4
1945	307.7	278.2	148.2	300.1	294.5	207.5	155.9
1946	346.0	298.7	173.6	358.5	329.9	222.5	185.1
1947	413.2	341.0	210.0	428.8	385.2	235.6	225.3
1948	460.7	394.9	218.8	504.7	439.5	288.9	242.2
1949	477.0	413.2	232.0	523.8	470.5	315.6	237.0
1950	509.1	421.4	251.2	520.1	496.4	336.4	246.3
1951	542.0	448.1	297.0	581.3	528.3	364.5	249.0
1952	568.8	467.1	296.5	605.3	559.6	370.7	248.8
1953	600.1	495.3	308.5	639.3	602.5	384.4	265.7
Dec. 1953	611.5	507.9	317.0	651.2	621.0	401.1	270.3
1954	628.0	510.2	317.0	659.3	636.0	403.8	270.4
Dec. 1954	643.3	514.1	317.0	665.3	648.2	405.8	269.7

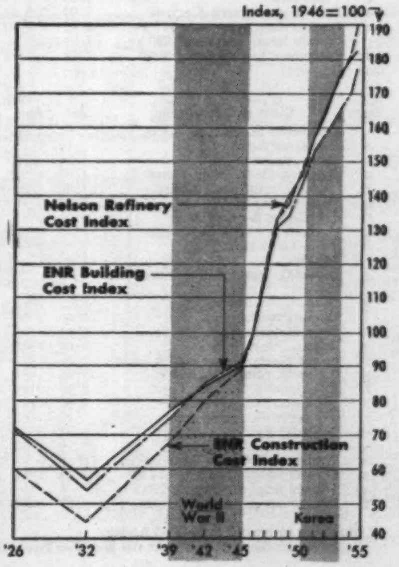
* Revised—steel pipe substituted for wrought iron pipe 1913 to date based on 3-in. & under diam. steel pipe.

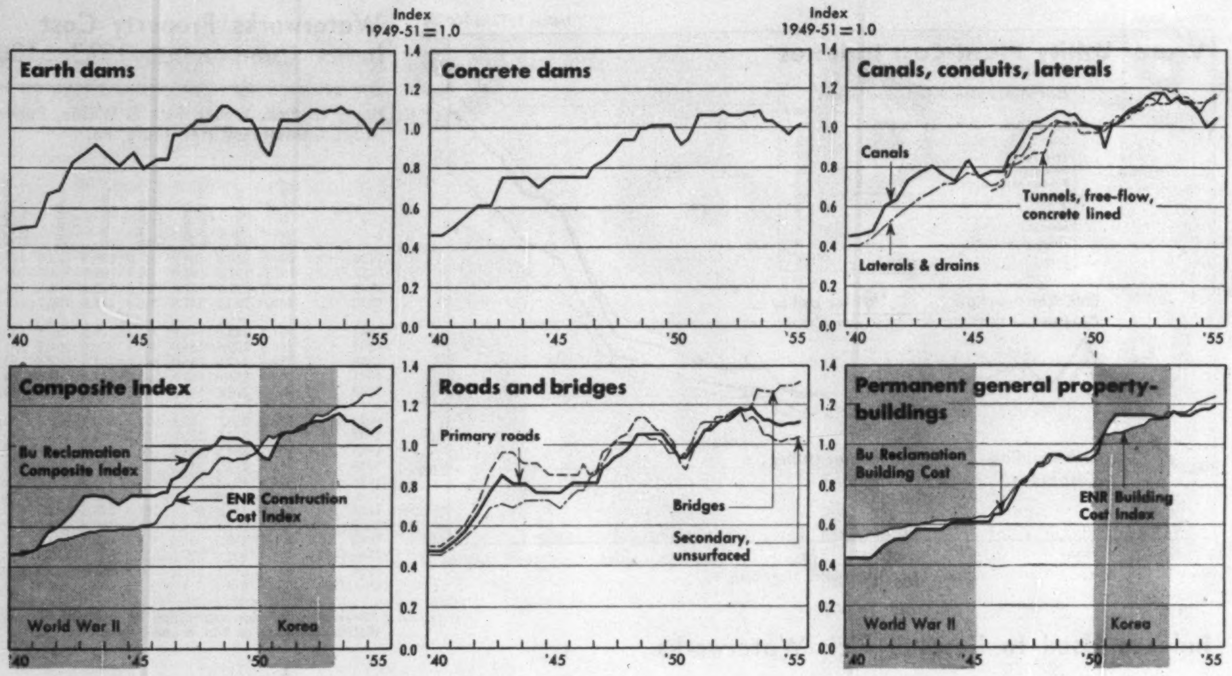
These special purpose indexes, tailored to fit individual waterworks properties, are compared here with the ENR general purpose cost indexes together with an illustration of how two properties can vary in cost trends depending on the ratio of treatment plant and other buildings to supply and distribution system.

For more detail on the purpose and construction of these indexes see ENR Oct. 8, 1953, p. 113.

Nelson Refinery Cost Index

This index applies to the costs of constructing refinery and natural gasoline plants since 1946, projected back to 1926. For more detail see ENR Oct. 8, 1953, p. 115.





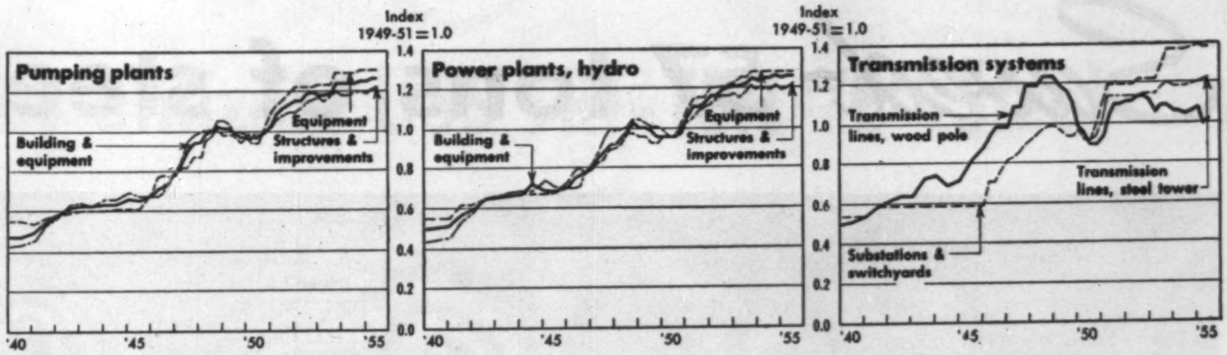
Irrigation and Hydro-power Construction Cost Indexes—1949–51 = 1.0

U. S. Bureau of Reclamation, Office of Assistant Commissioner and Chief Engineer, Denver, Colo.

Item	Class of Construction	Conv. fact*	1940		1941		1942		1943		1944		1945		1946			
			Jan.	July	Jan.	July	Jan.	July	Jan.	July	Jan.	July	Jan.	July	Jan.	Apr.	July	Oct
	Composite Index	**2.12**	**0.47**	**0.47**	**0.49**	**0.57**	**0.61**	**0.67**	**0.75**	**0.76**	**0.75**	**0.72**	**0.76**	**0.76**	**0.76**	**0.77**	**0.87**	**0.84**
a	Dams, earth	2.00	0.50	0.51	0.52	0.68	0.70	0.84	0.88	0.93	0.87	0.82	0.89	0.80	0.85	0.85	0.85	0.98
b	Dams, concrete	2.11	0.47	0.47	0.52	0.57	0.62	0.62	0.76	0.76	0.76	0.71	0.76	0.76	0.76	0.76	0.76	0.81
c	Pumping plants, bldg & equip	2.06	0.48	0.48	0.50	0.55	0.58	0.62	0.63	0.63	0.64	0.64	0.67	0.66	0.69	0.72	0.73	0.76
d	struct, reinf conc, & improv	2.31	0.43	0.44	0.46	0.53	0.57	0.63	0.64	0.63	0.66	0.66	0.70	0.68	0.68	0.68	0.70	0.75
e	equipment	1.81	0.55	0.55	0.54	0.56	0.58	0.59	0.60	0.60	0.60	0.61	0.61	0.61	0.70	0.77	0.78	0.77
f	pumps & prime equip	1.80	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
g	access elec & misc equip	1.86	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
h	discharge pipes	2.18	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0.69	0.69
i	Canals	2.16	0.46	0.47	0.49	0.61	0.64	0.73	0.78	0.81	0.77	0.74	0.85	0.76	0.78	0.78	0.78	0.86
j	Conduits, tunnels, free flow, conc lined	2.26	....	....	....	....	....	....	....	....	....	....	....	....	0.68	0.69	0.71	0.82
k	Laterals and drains	2.42	0.41	0.41	0.45	0.51	0.56	0.60	0.64	0.67	0.71	0.72	0.77	0.76	0.70	0.71	0.74	0.76
l	Primary roads	2.08	0.48	0.48	0.53	0.58	0.67	0.77	0.86	0.82	0.82	0.77	0.77	0.77	0.82	0.82	0.82	0.82
m	Secondary roads, unsurf	1.98	0.50	0.50	0.55	0.61	0.71	0.86	0.96	0.96	0.91	0.91	0.86	0.86	0.86	0.86	0.91	0.86
n	Bridges, steel	2.18	0.46	0.46	0.50	0.55	0.60	0.69	0.71	0.69	0.73	0.73	0.73	0.69	0.76	0.78	0.78	0.85
o	Power plants, hydro, bldg & equip	1.98	0.50	0.51	0.52	0.57	0.60	0.65	0.66	0.67	0.68	0.73	0.70	0.69	0.71	0.75	0.77	0.78
p	structs, reinf conc, imprv	2.28	0.44	0.45	0.46	0.53	0.58	0.65	0.67	0.68	0.69	0.69	0.74	0.71	0.70	0.70	0.71	0.78
r	equipment	1.83	0.55	0.55	0.55	0.62	0.62	0.65	0.66	0.66	0.68	0.67	0.67	0.68	0.73	0.78	0.80	0.78
s	turbines & generators	1.80	0.56	0.56	0.56	0.64	0.67	0.67	0.68	0.68	0.70	0.69	0.69	0.69	0.76	0.80	0.83	0.80
t	acces elec equip	1.84	0.54	0.54	0.55	0.56	0.55	0.57	0.58	0.58	0.58	0.58	0.59	0.61	0.65	0.72	0.72	0.73
u	misc equip	1.95	0.51	0.51	0.53	0.55	0.58	0.65	0.65	0.67	0.68	0.71	0.70	0.71	0.70	0.70	0.73	0.73
v	penstocks	2.18	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0.69	0.69
w	Transm switchyards & substa	2.03	0.54	0.54	0.54	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.70	0.70	0.76
x	Transm lines, wood pole 115 kv	2.02	0.50	0.52	0.54	0.59	0.62	0.64	0.64	0.73	0.74	0.69	0.72	0.82	0.89	0.94	0.99	0.99
y	Transm lines, steel tower 230 kv	1.91	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
z	Permanent genl property, bldgs	2.26	0.44	0.44	0.44	0.49	0.53	0.53	0.58	0.58	0.58	0.62	0.62	0.62	0.62	0.66	0.66	0.68

Item	Class of Construction	1949				1950				1951				1952				1953	
		Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.
	Composite Index	**1.04**	**1.04**	**1.04**	**1.02**	**1.02**	**0.98**	**0.95**	**0.94**	**1.01**	**1.05**	**1.07**	**1.07**	**1.10**	**1.11**	**1.12**	**1.13**	**1.13**	**1.14**
a	Dams, earth	1.12	1.10	1.08	1.05	1.05	1.00	0.92	0.88	0.98	1.05	1.05	1.05	1.05	1.08	1.10	1.10	1.09	1.10
b	Dams, concrete	1.00	1.02	1.02	1.02	1.02	0.97	0.93	0.95	1.02	1.07	1.07	1.07	1.07	1.09	1.07	1.07	1.07	1.08
c	Pumping plants, bldg & equip	1.02	1.02	1.00	0.97	0.97	0.97	0.97	1.00	1.04	1.09	1.12	1.14	1.16	1.16	1.19	1.20	1.18	1.18
d	struct, reinf conc, & improv	1.06	1.04	1.00	1.00	0.98	0.98	0.98	1.00	1.02	1.06	1.08	1.10	1.10	1.12	1.15	1.16	1.17	1.15
e	equipment	0.98	0.98	0.97	0.94	0.97	0.94	0.94	1.02	1.10	1.13	1.16	1.19	1.22	1.22	1.22	1.22	1.23	1.23
f	pumps & prime equip	0.94	0.97	0.97	0.94	0.97	0.94	0.94	1.00	1.08	1.14	1.17	1.17	1.22	1.22	1.22	1.22	1.28	1.28
g	access elec & misc equip	1.05	0.99	0.97	0.97	0.97	0.94	0.94	1.02	1.10	1.10	1.18	1.18	1.18	1.18	1.18	1.18	1.12	1.13
h	discharge pipes	1.10	1.06	0.96	0.94	0.94	0.96	0.96	1.03	1.08	1.12	1.15	1.15	1.17	1.17	1.19	1.21	1.21	1.21
i	Canals	1.08	1.06	1.07	1.02	1.01	1.00	1.00	0.90	1.00	1.02	1.06	1.09	1.11	1.13	1.16	1.18	1.18	1.18
j	Conduits, tunnels, free flow, conc lined	1.02	1.02	1.02	0.97	0.97	0.97	0.97	1.02	1.02	1.06	1.04	1.08	1.08	1.11	1.15	1.15	1.13	1.13
k	Laterals and drains	1.02	1.01	1.02	1.01	1.00	1.00	0.98	0.98	1.01	1.01	1.03	1.05	1.10	1.09	1.12	1.12	1.14	1.20
l	Primary roads	1.06	1.06	1.06	1.06	1.01	0.98	0.94	0.94	0.99	1.03	1.08	1.08	1.11	1.13	1.13	1.15	1.18	1.18
m	Secondary roads, unsurf	1.14	1.11	1.08	1.08	1.04	1.01	0.91	0.88	0.96	1.01	1.06	1.09	1.14	1.14	1.14	1.16	1.19	1.12
n	Bridges, steel	1.06	1.03	1.03	1.01	0.96	0.96	0.94	0.96	1.01	1.10	1.12	1.12	1.12	1.12	1.15	1.17	1.19	1.17
o	Power plants, hydro, bldg & equip	1.01	1.01	0.99	0.96	0.96	0.96	0.96	0.98	1.06	1.11	1.11	1.13	1.16	1.16	1.19	1.20	1.21	1.21
p	structs, reinf conc, imprv	1.05	1.03	1.01	1.01	0.99	0.96	0.96	0.99	1.03	1.05	1.09	1.10	1.12	1.14	1.16	1.16	1.17	1.15
r	equipment	0.96	0.96	0.93	0.93	0.96	0.96	0.96	1.01	1.09	1.14	1.15	1.15	1.20	1.20	1.20	1.21	1.23	1.25
s	turbines & generators	0.97	0.97	0.94	0.94	0.97	0.94	0.94	1.00	1.08	1.17	1.17	1.17	1.22	1.25	1.22	1.24	1.27	1.29
t	acces elec equip	1.01	1.01	0.98	0.92	0.92	0.92	0.95	1.01	1.14	1.14	1.14	1.14	1.20	1.20	1.20	1.21	1.15	1.16
u	misc equip	1.05	1.05	0.98	0.95	0.97	0.95	0.97	1.00	1.08	1.10	1.13	1.13	1.13	1.13	1.13	1.13	1.15	1.14
v	penstocks	1.10	1.06	0.96	0.94	0.94	0.96	0.96	1.03	1.08	1.12	1.15	1.15	1.17	1.17	1.19	1.21	1.21	1.21
w	Transm switchyards & substa	0.99	0.97	0.94	0.94	0.97	0.92	0.92	1.01	1.11	1.19	1.19	1.19	1.19	1.19	1.22	1.22	1.22	1.22
x	Transm lines, wood pole 115 kv	1.24	1.19	1.16	1.11	0.99	0.96	0.89	0.89	0.94	1.04	1.09	1.09	1.11	1.11	1.13	1.13	1.11	1.06
y	Transm lines, steel tower 230 kv	....	....	....	....	....	....	0.92	0.94	1.02	1.13	1.13	1.13	1.13	1.13	1.13	1.14	1.14	1.14
z	Permanent genl property, bldgs	0.95	0.93	0.93	0.93	0.93	0.93	0.95	1.06	1.11	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.14	1.14

* Multiplier to convert to 1940 = 1.0 base
Based on combined costs of material and labor furnished by the contractor, and material and labor furnished by the government on B of R projects in 17 western states and Alaska



IRRIGATION AND HYDRO-POWER construction cost indexes computed by the Bureau of Reclamation, Department of Interior, turn up in 1955 after decline from 1953 high.

Reclamation Indexes

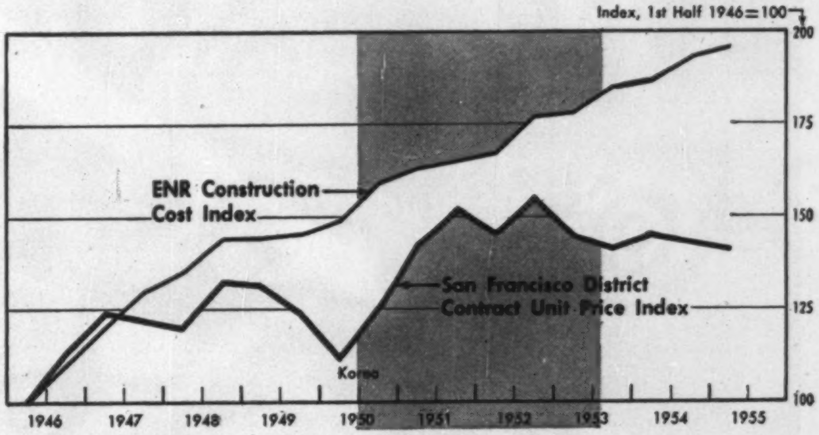
Bureau of Reclamation cost indexes measure trends for 26 types of work. The composite index includes a concrete dam, power generating plant, power transmission system, earth dam, canals, laterals and drains.

1947				1948				
Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Item
0.86	**0.89**	**0.94**	**0.97**	**0.99**	**0.99**	**1.01**	**1.05**	
0.98	1.00	1.02	1.05	1.05	1.05	1.08	1.12	a
0.83	0.85	0.88	0.92	0.95	0.95	0.95	1.00	b
0.80	0.85	0.90	0.94	0.95	0.99	1.01	1.04	c
0.80	0.86	0.95	0.98	1.00	1.01	1.01	1.06	d
0.78	0.82	0.82	0.87	0.87	0.95	0.97	1.02	e
....	....	....	....	....	....	....	1.03	f
....	....	....	....	....	....	....	1.08	g
0.82	0.87	0.89	0.92	0.92	0.96	1.03	1.10	h
0.89	0.94	0.99	1.02	1.02	1.04	1.06	1.08	i
0.82	0.84	0.86	0.88	0.88	0.88	0.97	1.02	j
0.86	0.86	0.91	0.97	0.97	0.98	1.01	1.03	k
0.82	0.89	0.91	0.94	0.96	0.98	1.01	1.06	l
0.88	0.96	0.98	1.01	1.04	1.06	1.11	1.14	m
0.87	0.92	0.96	1.01	1.01	1.01	1.01	1.06	n
0.80	0.85	0.88	0.92	0.93	0.96	0.99	1.04	o
0.82	0.87	0.95	0.99	0.99	1.00	1.01	1.05	p
0.79	0.82	0.84	0.89	0.90	0.92	0.98	0.98	r
0.81	0.83	0.83	0.89	0.89	0.92	0.98	1.00	s
0.74	0.89	0.89	0.89	0.99	1.01	1.02	1.03	t
0.76	0.81	0.81	0.88	0.89	0.92	1.02	1.08	u
0.82	0.87	0.89	0.92	0.92	0.96	1.03	1.10	v
0.81	0.83	0.86	0.89	0.92	0.94	0.97	0.99	w
0.99	1.09	1.09	1.19	1.19	1.19	1.24	1.24	x
....	....	....	....	....	....	....	....	y
0.75	0.82	0.84	0.86	0.91	0.91	0.95	0.95	z

1953		1954				1955			
July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Item
1.16	**1.17**	**1.13**	**1.13**	**1.11**	**1.09**	**1.07**	**1.09**	**1.11**	
1.10	1.12	1.09	1.09	1.06	1.03	0.98	1.03	1.05	a
1.08	1.09	1.04	1.04	1.02	1.00	0.97	1.00	1.02	b
1.19	1.24	1.24	1.24	1.24	1.25	1.25	1.26	1.26	c
1.18	1.20	1.18	1.18	1.19	1.20	1.19	1.21	1.22	d
1.23	1.29	1.29	1.29	1.29	1.30	1.30	1.30	1.30	e
1.28	1.34	1.34	1.34	1.35	1.35	1.35	1.35	1.35	f
1.15	1.18	1.19	1.20	1.20	1.20	1.20	1.20	1.20	g
1.25	1.31	1.30	1.30	1.28	1.30	1.32	1.34	1.36	h
1.14	1.16	1.13	1.13	1.11	1.08	1.00	1.02	1.05	i
1.13	1.16	1.16	1.16	1.13	1.13	1.14	1.15	1.16	j
1.19	1.20	1.14	1.14	1.12	1.09	1.15	1.16	1.18	k
1.19	1.16	1.13	1.13	1.11	1.10	1.11	1.11	1.12	l
1.14	1.12	1.05	1.05	1.03	1.02	1.03	1.03	1.04	m
1.20	1.28	1.27	1.27	1.27	1.30	1.30	1.30	1.32	n
1.22	1.25	1.24	1.25	1.25	1.26	1.25	1.26	1.26	o
1.18	1.21	1.19	1.19	1.19	1.21	1.19	1.20	1.22	p
1.25	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	r
1.28	1.31	1.31	1.31	1.32	1.32	1.31	1.31	1.31	s
1.18	1.21	1.22	1.23	1.23	1.23	1.24	1.24	1.24	t
1.15	1.18	1.17	1.17	1.17	1.19	1.20	1.21	1.23	u
1.25	1.31	1.30	1.30	1.28	1.30	1.32	1.34	1.36	v
1.31	1.37	1.37	1.37	1.37	1.38	1.39	1.38	1.38	w
1.09	1.09	1.06	1.06	1.05	1.06	1.08	1.00	1.02	x
1.18	1.20	1.18	1.18	1.18	1.19	1.20	1.21	1.22	y
1.14	1.17	1.15	1.15	1.15	1.17	1.18	1.18	1.20	z

Bids Prices in Western States

The downtrend in bid prices since 1953 continues in the face of rising costs. Evidence of this trend in the western states comes from the index compiled by the Estimate Section, San Francisco District, Corps of Engineers, U. S. Army based on the average of three low bids on all significant projects for which unit prices were reported in "Daily Construction Service." The index, its components and their weights are shown here.



Contract Unit Price Index—Western States

Estimates Section, San Francisco District, Corps of Engineers, U. S. Army—1st half 1946 = 100

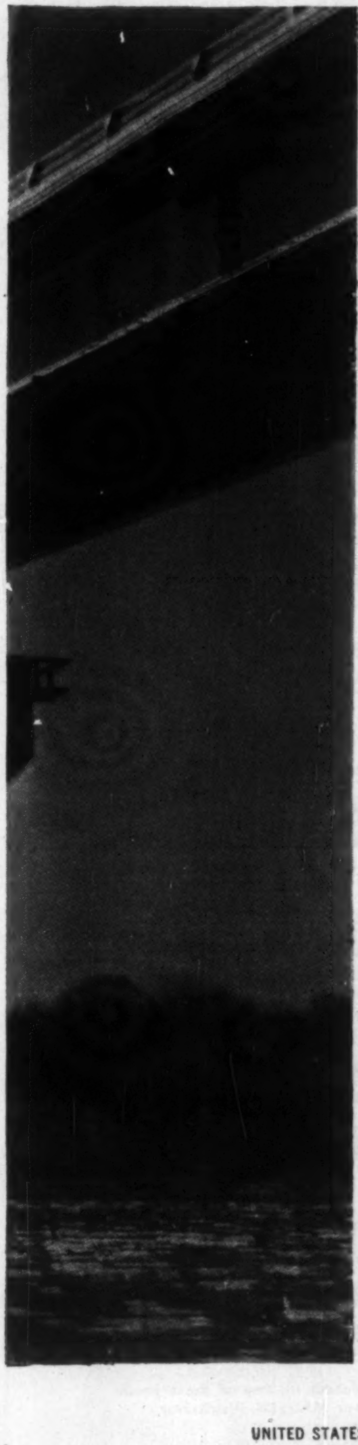
		1946	1949		1950		1952		1953		1954		1955
		1st half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half
Index. 1st Hf '46 = 100		**100.0**	**132.2**	**124.3**	**111.9**	**126.08**	**144.76**	**155.04**	**146.35**	**140.50**	**145.09**	**142.83**	**141.37**
Items used in index	**Unit**					**Based on these average unit prices**							
Cr rock base course	**ton**	2.81	2.29	2.41	2.37	2.20	2.60	3.18	2.80	3.03	2.96	2.92	3.03
Plant mix aggregate	**ton**	4.82	4.43	4.35	3.75	4.68	5.51	5.25	5.99	5.16	5.84	5.43	5.86
Plant mix asphalt	**ton**	22.00	26.85	22.20	18.98	23.00	24.34	24.60	24.00	26.00	21.46	26.00	25.00
Cover aggregate	**ton**	5.09	5.65	5.50	5.22	5.07	4.06	6.62	6.37	6.44	6.42	6.39	6.63
Structural concrete	**cy**	50.65	65.07	59.20	54.11	58.00	75.81	73.20	71.00	72.00	67.71	70.41	67.00
Pavement concrete	**cy**	13.20	19.69	24.83	18.50	20.00	18.97	28.88	19.00	19.00	19.09	21.55	22.00
Reinforcing steel	**cwt**	9.60	12.70	11.40	11.00	13.40	14.30	14.60	13.70	14.00	14.00	14.00	13.00
Cement	**bbl**	2.84	4.98	4.52	4.24	4.75	4.63	4.77	4.83	4.91	4.63	4.52	4.68
CM pipe 12"	**lf**	2.20	3.03	2.88	2.75	3.00	3.65	3.85	3.61	3.78	3.70	3.67	3.60
CM pipe 24"	**lf**	4.05	5.26	4.88	4.82	5.23	6.16	6.53	6.46	6.75	6.33	6.55	6.84
RC pipe 18"	**lf**	3.50	4.27	4.55	4.54	5.08	5.50	5.83	6.25	5.51	5.10	5.37	5.15
RC pipe 36"	**lf**	8.29	10.47	10.70	9.48	10.26	14.33	13.27	13.94	12.66	11.24	11.66	11.62
VC pipe 6"	**lf**	1.87	2.39	2.29	2.00	2.44	2.94	3.32	3.01	2.87	2.80	2.98	2.75
VC pipe 8"	**lf**	2.22	2.80	2.81	2.82	2.60	3.77	3.93	3.53	3.46	3.40	3.83	3.36
Sewer manhole	**1/10 ea**	16.50	20.80	19.20	17.80	21.20	22.82	26.66	25.34	17.60	23.67	23.33	23.70
Roadway excavation	**cy**	0.67	.96	.90	.64	.78	.92	1.22	1.07	1.15	.87	.90	.80
Structural excavation	**cy**	2.49	4.27	3.26	3.14	3.76	3.42	3.70	3.57	4.26	3.72	3.96	3.78
Watering	**M gal**	2.13	2.13	1.75	1.66	1.84	1.97	2.22	2.14	2.07	1.74	1.70	1.71
Flat wheel roller	**R-hr**	5.47	7.82	6.86	7.79	6.92	7.26	8.68	8.00	9.36	9.86	7.05	8.50
Piling, gr wood, fur	**lf**	0.64	0.65	0.58	0.64	0.88	1.68	1.09	1.01	1.38	1.48	1.31	1.17
Piling, treated, fur	**lf**	1.25	1.45	1.45	1.20	1.53	2.03	1.93	1.77	1.74	1.64	2.01	1.84
Timber in place	**100 fbm**	16.60	26.33	25.34	21.20	27.70	30.90	30.50	30.80	28.00	42.20	27.50	32.10
2" Galv steel pipe	**lf**	1.04	1.38	1.18	1.24	1.33	1.51	1.61	1.68	1.45	1.62	1.62	1.65
Cast-iron pipe 6"	**lf**	2.86	4.17	3.93	3.50	3.86	4.42	5.57	4.15	4.53	4.15	4.34	4.36
Cast-iron pipe 8"	**lf**	3.80	6.47	5.01	5.35	5.66	6.29	6.64	5.66	5.68	5.04	6.71	4.80
Gate valve 6"	**1/10 ea**	7.06	9.70	8.80	8.00	9.00	10.55	12.60	11.80	9.30	10.30	10.20	8.85
Total in dollars		**193.65**	**258.01**	**240.78**	**216.74**	**244.17**	**280.34**	**300.25**	**281.48**	**272.09**	**280.97**	**276.80**	**273.78**

Saved– **57 tons of steel.**

USS HIGH STRENGTH STEELS

–the big step forward in bridge construction

. . by utilizing USS TRI-TEN "E" Steel



ALTERNATE DESIGNS of this 2-lane highway bridge crossing the Missouri River at Leavenworth, Kansas, called for the use of either 880 tons of structural silicon steel, or 823 tons of USS TRI-TEN "E" Steel. Fifty-seven tons of steel were saved by adopting TRI-TEN "E" Steel.

Here again, as it has in a number of bridges recently constructed or now being erected, the use of USS High Strength Steels saves weight and saves steel. And because of the smaller tonnage of steel required by such construction, material costs, too, are frequently lower, steel transportation costs are also reduced as are the size and cost of secondary members and foundations. Together these add up to total cost savings that in some cases have run as high as 15% of the cost of the superstructure.

USS TRI-TEN "E" Steel is a high strength low-alloy steel particularly adapted for use in welded construction and intended primarily for weight reduction by means of greater strength and toughness.

This superior steel meets all the requirements of ASTM Specification A242. With a yield point 50% greater than that of structural carbon steel (ASTM A7) in thicknesses of ¾" and less, the slightly higher cost of USS TRI-TEN "E" Steel can generally be justified—even without consideration of the other cost reducing benefits mentioned above.

USS TRI-TEN "E" Steel has been used or specified in such bridges as the Columbia River Bridge at Umatilla, Oregon (1964 tons); The Paseo Bridge over the Missouri River at Kansas City, Missouri (3759 tons); the Ohio River Bridge at Shawneetown, Ill. (2295 tons); the Missouri River Bridge at Jefferson City, Missouri (1692 tons). These structures are typical of the growing list of bridges in which USS High Strength Steels are being used to provide maximum strength, safety and durability with a minimum of weight and costs.

NOW AVAILABLE . . . Our new "Design Manual for High Strength Steels" is ready for distribution. This excellent book contains comprehensive and practical information that you will find extremely useful in designing your product for great economy and efficiency by the sound use of high strength steels.

For your free copy, write on your company letterhead giving your title or department, to United States Steel Corporation, Room 4951, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

◀ **TO SAVE WEIGHT HERE, USS Tri-Ten "E" was used for arch ribs and tiegirders of the two 420-ft. long continuous tied arch span. Owner—City of Leavenworth, Kansas. Designed and engineered by Howard, Needles, Tammen and Bergendoff of Kansas City. Structural steel fabrication—main span by Kansas City Structural Steel Co.; Missouri approach and Kansas approach by Missouri Valley Steel, Inc. of Leavenworth, Kansas. Erection—Missouri approach and main span by Kansas City Bridge Company; Kansas approach by Maxwell Bridge Co., Columbus, Kansas.**

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · NATIONAL TUBE DIVISION, PITTSBURGH
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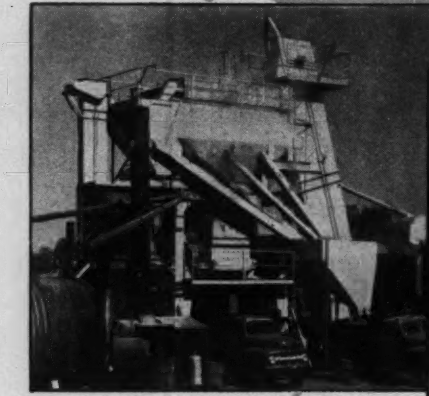
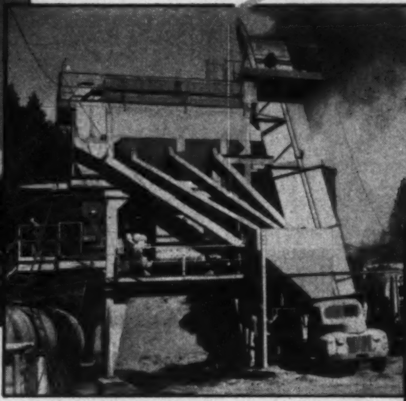
UNITED STATES STEEL

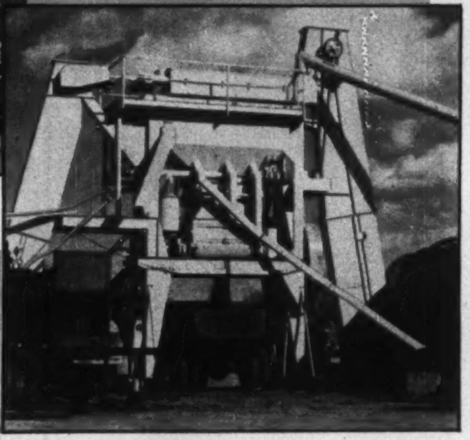
ACROSS AMERICA MADSEN ASPHALT PLANTS



- The MADSEN Model 481 4000-lb. Batch Capacity Asphalt Plant operating in the midwest.



- Here is a MADSEN Model 481 Asphalt Plant producing materials for an Oregon State highway project.



- A MADSEN 2000-lb. SPECIAL Asphalt Plant in operation for a Minnesota contractor.

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- CYCLONE "ON-THE-SQUARE" DUST COLLECTORS
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- WET TUBE DUST WASHERS
- ROAD PUG TRAVEL-MIX PLANTS
- WEIGH BATCHERS
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Highway Price Skid Ends in the West as Contractors Raise Bids

Highway contractors are bidding their way out of a profitless prosperity. During the first quarter of '55 nearly all of the western states which compute quarterly or monthly highway bid price indexes reported the price depression of '53-'54 running even deeper this year. But the picture changed abruptly during the second quarter when all indexes reported in showed contractors upping their bids substantially.

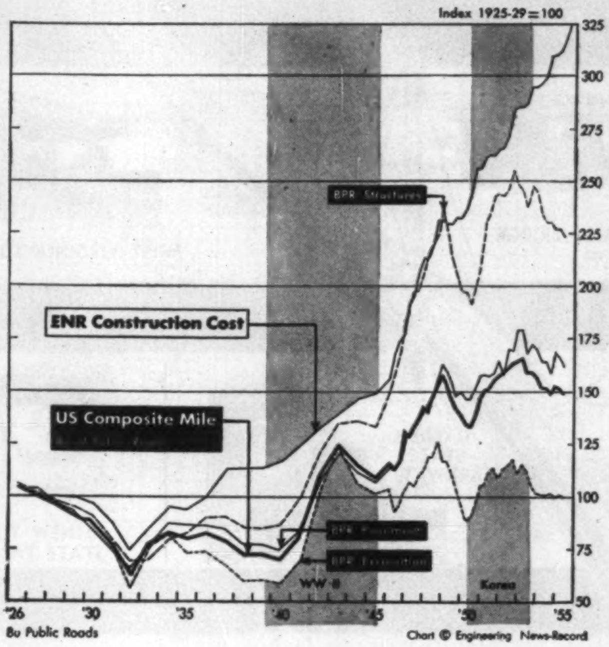
California's second quarter highway price index jumped 12% above the first quarter. In other states the increases were: Oregon, 9%; Washington, 5.8%; Idaho, 5.7% (this was on top of a big first quarter increase); Texas, 4.5%; Oklahoma, 8.7%; and Nebraska, 6.1%. Minnesota's semi-annual index indicated contractors raising their prices in the first half of this year 2% above the second half of 1954.

Nationally, the Bureau of Public Roads Composite Mile Price Index for federal-aid highway projects ran counter to the western states indexes as it dipped 1.6% in the second quarter. It was the second consecutive quarterly decline following a rise in the final quarter of '54.

While none of the eastern states have reported in because they compute their indexes annually, Pennsylvania reports average prices on most major bid items dropped in the first half of this year below the first half of 1954 and most were also below the second half of '54.

In some of the states where highway prices started up in '55 the rise was expected. States reasoned this way: Contractors have run out of ways to trim their costs; they'll have to raise their prices if labor and materials costs move up. During the first six months of this year, materials and labor costs paid by contractors climbed by 2.1% as measured by the ENR 20-Cities Construction Cost Index. For the first nine months, costs are up 4.7%. Highway contractors can't absorb a cost rise of that magnitude. Bid prices should continue to firm up during the second half of this year.

On this and the following pages are the records of state highway price indexes reported to ENR. Charts compare index trends in neighboring states with the U.S. Composite Mile. For some states, a complete record and description of the index were in last year's Cost Issue (ENR Oct. 7, 1955, p. 115) and these have not been repeated this year because later index values haven't been computed as we go to press.



Bu Public Roads

Chart © Engineering News-Record

Composite Standard Mile Highway Price Index

U. S. Bureau of Public Roads, 1925-29 = 100

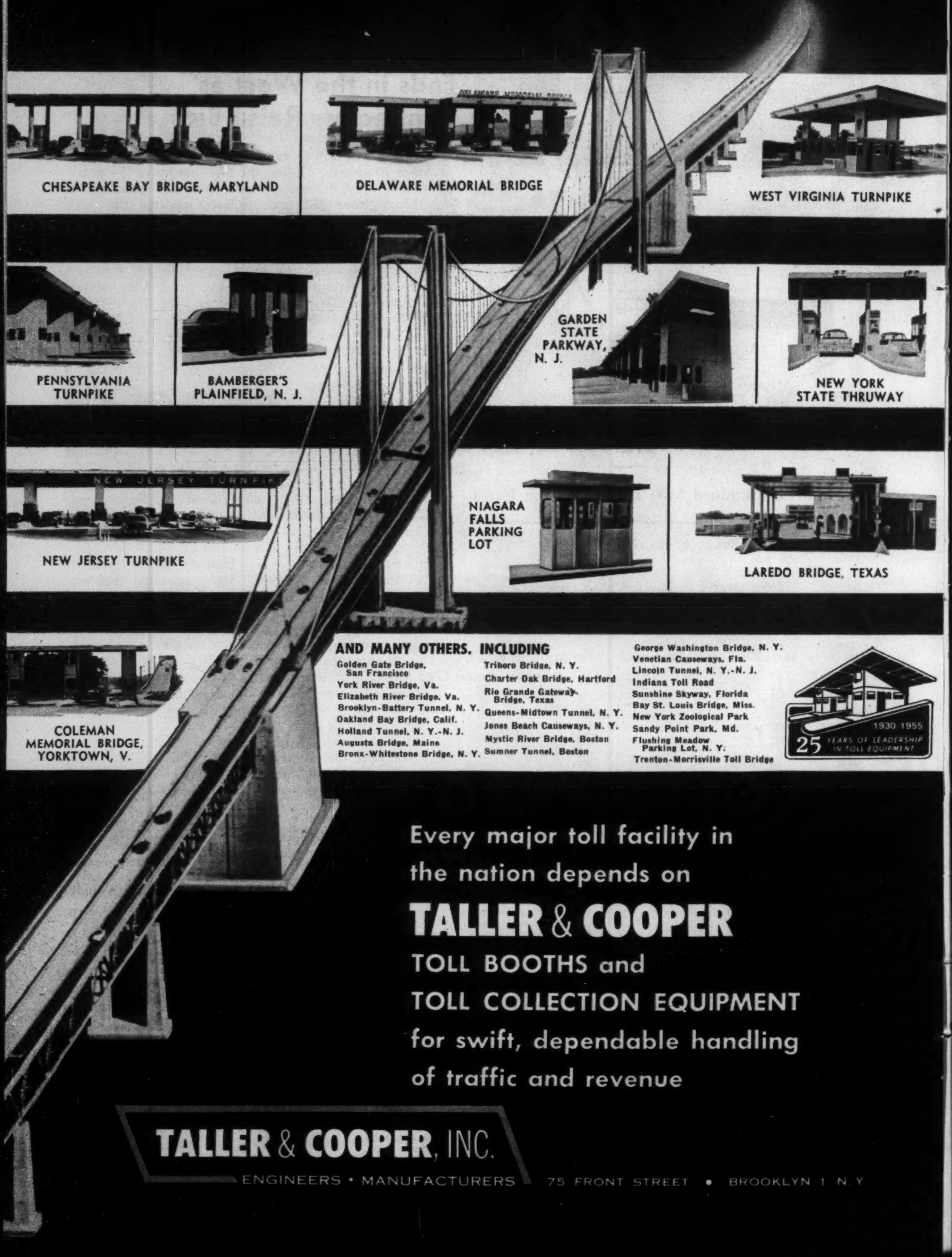
Year	Excavation[1] 17,491 cy* Bid price[3]	Excavation[1] Sub-index	Surfacing[2] 3,726 sy* Bid price[3]	Surfacing[2] Sub-index	Structures: Reinf. steel 16,000* lb. Bid price[3]	Structures: Struct. steel 4,325* lb. Bid price[3]	Structures: Struct. concr. 68* cy Bid price[3]	Structures: Comb. Sub-index	Composite mile index
Base									
25-'29=100	$0.35†	100.0	$2.22†	100.0	$0.052†	$0.067†	$22.15†	100.0	100.0
1926	.36	103.7	2.29	103.1	.053	.074	22.76	103.7	103.4
1930	.30	86.3	1.86	84.1	.045	.061	20.08	89.4	85.7
1932	.18	55.0	1.44	64.8	.034	.046	15.33	68.0	61.0
1939	.21	59.8	1.73	77.8	.044	.059	19.13	85.9	72.6
1940	.21	59.2	1.68	75.6	.045	.063	19.17	87.6	71.6
1941	.24	69.2	1.87	84.1	.054	.076	21.44	100.8	81.4
1942	.37	104.1	2.39	107.9	.065	.090	26.16	122.3	108.8
1943	.44	124.0	2.71	122.3	.067	.095	30.19	134.4	124.9
1944	.37	106.6	2.45	110.6	.064	.089	31.94	136.5	113.1
1945	.36	101.6	2.38	107.4	.062	.077	31.62	132.5	109.0
1946	.35	99.1	2.65	119.3	.075	.113	38.79	164.7	119.0
1947	.38	108.4	3.01	135.5	.093	.132	45.84	196.9	135.0
1948	.42	119.3	3.37	151.9	.108	.158	51.00	223.9	151.2
1949	.38	107.4	3.40	153.1	.104	.146	47.36	210.3	145.8
1950:	.33	94.5	3.32	149.8	.100	.139	44.62	199.4	137.7
1951:	**.39**	**110.0**	**3.54**	**159.5**	**.120**	**.180**	**52.07**	**237.8**	**153.7**
Q1	.37	106.3	3.51	158.3	.116	.180	50.12	230.4	150.6
Q2	.39	111.4	3.48	156.9	.119	.170	51.45	234.0	152.4
Q3	.40	113.7	3.51	158.3	.122	.182	53.21	242.5	155.1
Q4	.38	108.5	3.65	164.6	.123	.187	53.51	244.3	156.7
1952:	**.40**	**114.2**	**3.80**	**171.3**	**.124**	**.186**	**54.50**	**247.8**	**162.5**
Q1	.40	112.8	3.71	158.3	.123	.184	52.97	242.5	159.3
Q2	.41	115.4	3.78	170.4	.122	.175	54.80	245.5	162.1
Q3	.41	117.9	3.74	168.6	.126	.195	56.55	255.4	163.6
Q4	.39	110.5	3.97	179.0	.126	.191	53.69	247.7	164.9
1953:	**.38**	**108.6**	**3.82**	**172.0**	**.122**	**.186**	**53.53**	**243.8**	**160.2**
Q1	.40	114.8	3.96	178.5	.121	.192	53.91	245.4	165.9
Q2	.39	112.0	3.73	168.2	.120	.180	51.67	237.1	158.5
Q3	.37	105.1	3.81	171.8	.123	.196	54.07	247.6	159.4
Q4	.36	102.3	3.76	169.5	.123	.175	54.48	245.0	156.9
1954:	**.35**	**100.9**	**3.63**	**163.6**	**.118**	**.167**	**50.91**	**229.9**	**151.2**
Q1	.36	101.4	3.63	163.7	.115	.174	52.00	233.9	152.0
Q2	.35	100.9	3.63	163.7	.115	.167	50.61	229.1	151.1
Q3	.36	101.4	3.53	159.2	.117	.167	50.64	229.9	149.2
Q4	.35	100.0	3.72	167.7	.115	.158	50.40	226.8	152.4
1955:									
Q1	.36	101.1	3.67	165.5	.113	.157	51.14	227.3	151.8
Q2	.35	100.3	3.60	162.3	.112	.152	50.09	223.3	149.4

[1] Common excav. plus other excav. items expressed as equivalent common excav.
[2] Portland-cmt. concr. plus other surfacing expressed as equivalent portland-cmt. concr.
[3] Calculated to one more decimal place than shown in this table. ** Fixed quantities used for establishing composite mile for price trend. *†Prices used for establishing composite mile index bases.

Colorado, Unit Prices Used in Contract Price Index

Item	Unit	Quantity	Unit Price 1949	Unit Price 1951	Unit Price 1952	Unit Price 1953	Unit Price 1954	Unit Price 2nd Q 1955
Excavation, unclass	cy	10,630	$0.441	$0.338	$0.374	$0.290	$0.277	$0.241
struct.	cy	109	3.376	3.113	3.983	2.645	2.045	2.147
Backfill, struct	cy	116	1.948	1.929	1.888	1.654	1.443	1.089
Rolling	hr	88	7.470	8.089	9.174	8.973	8.843	8.316
Wetting	Mgal	351	1.382	1.407	1.261	1.095	1.123	1.007
Overhaul	stay	64,112	0.014	0.010	0.012	0.009	0.008	0.007
	ydml	6,055	0.122	0.107	0.110	0.097	0.099	0.106
	tnml	12,188	0.091	0.079	0.111	0.082	0.073	0.076
Sub-base	t	2,998*	0.521	0.566	0.589	0.542	0.376	0.357
Gravel, cr rock surf	t	1,976	0.894	0.974	1.094	0.939	0.746	0.812
Asphalt	t	17	37.500	32.154	36.928	27.868	26.236	27.153
liquid	gal	10,252	0.151	0.153	0.162	0.152	0.148	0.160
Road mix process	sy	4,659	0.097	0.089	0.090	0.089	0.082	0.078
Stone screenings	t	70	3.727	5.755	6.299	5.809	5.106	5.315
Asph surf, plant mix	t	279	4.500	4.103	4.624	3.434	3.315	3.132
Concrete pavement	sy	449	3.512	2.800	3.473	3.432	3.858	4.227
Bridge timber	Mfbm	1	236.378	325.395	309.120	268.521	263.387	368.557
Concrete	cy	38	48.564	51.007	53.777	53.539	48.721	46.943
Steel, reinf	lb	4,107	0.115	0.072	0.067	0.083	0.111	0.105
struct	lb	7,114	0.133	0.051	0.114	0.095	0.142	0.130
Culvert, RCCP	lf	16ƒ	8.263	18.059	7.078	6.392	6.303	5.091
CMP	lf	109ƒ	5.823	6.924	7.335	7.501	7.366	6.735
Fence, barbed wire	lf	1,288	0.220	0.235	0.239	0.232	0.222	0.220
Sewer pipe	lf	17ƒ	7.504	10.440	5.898	6.655	7.498	7.431†

* Incl all matl whether bid as sub-base or select borrow ƒ Incl all diam priced at average of all pipe used † estimated


CHESAPEAKE BAY BRIDGE, MARYLAND
DELAWARE MEMORIAL BRIDGE
WEST VIRGINIA TURNPIKE
PENNSYLVANIA TURNPIKE
BAMBERGER'S PLAINFIELD, N. J.
GARDEN STATE PARKWAY, N. J.
NEW YORK STATE THRUWAY
NEW JERSEY TURNPIKE
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- Elizabeth River Bridge, Va.
- Brooklyn-Battery Tunnel, N. Y.
- Oakland Bay Bridge, Calif.
- Holland Tunnel, N. Y.-N. J.
- Augusta Bridge, Maine
- Bronx-Whitestone Bridge, N. Y.
- Triboro Bridge, N. Y.
- Charter Oak Bridge, Hartford
- Rio Grande Gateway Bridge, Texas
- Queens-Midtown Tunnel, N. Y.
- Jones Beach Causeways, N. Y.
- Mystic River Bridge, Boston
- Sumner Tunnel, Boston
- George Washington Bridge, N. Y.
- Venetian Causeways, Fla.
- Lincoln Tunnel, N. Y.-N. J.
- Indiana Toll Road
- Sunshine Skyway, Florida
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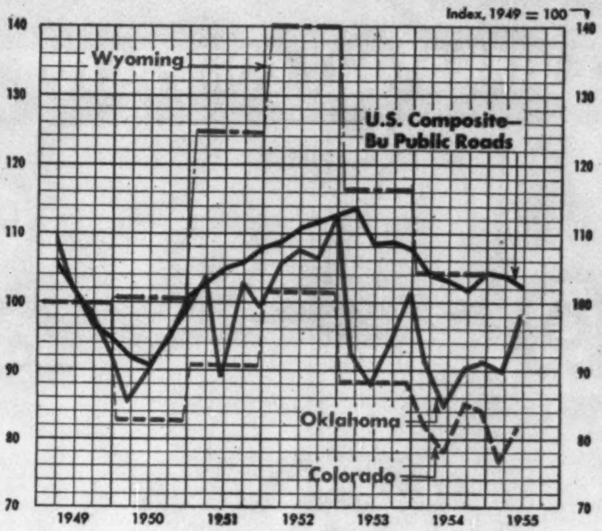


• **Wyoming** computes its composite highway price index by first computing sub-indexes for each of six bid items (see table below). These sub-indexes, based on 1940 = 100, are then multiplied by percentage weights and added to get the composite index.

Wyoming, Average Unit Prices and Index

Weight Year	Excav common 39% $/cy	Grav base* 29% $/cy	Oil 9% ¢/gal	Conc Cl A 11% $/cy	Struct steel 6% $/lb	Timber treatd piling 6% $/lf	Comp. Index '40=100
1940........	$0.125	$0.670	$0.067	$18.15	$0.067	$1.25	100
1941........	0.156	0.913	0.084	22.35	0.087	1.238	126
1942........	0.271	1.136	0.094	25.00	0.091	1.599	178
1943........	0.240	1.074	0.091	24.26	0.095	1.908	166
1944........	0.327	1.122	0.087	36.59	0.099	2.047	203
1945........	0.331	1.204	0.087	30.72	0.102	1.250	201
1946........	0.250	1.263	0.093	33.61	0.108	2.105	186
1947........	0.284	0.860	0.124	45.89	0.151	2.421	197
1948........	0.238	0.953	0.152	55.20	0.168	3.562	200
1949........	0.199	0.780	0.124	48.00	0.145	2.512	167
1950........	0.218	0.743	0.104	51.90	0.147	2.351	169
1951........	0.281	0.945	0.125	52.53	0.203	2.724	209
1952........	0.344	0.907	0.126	68.00	0.193	3.150	238
1953........	0.254	0.827	0.128	50.80	0.196	3.084	196
1954........	0.226	0.777	0.109	51.93	0.128	2.731	175

* surfacing and haul

State Highway Bid Prices Indexes—1937-Date

Reported by State Highway Departments to Engineering News-Record

State	California Bridges	California Highway	Oregon	Washington	Idaho	Montana	New Mexico	Texas	Oklahoma	Colorado	Wyoming	Nebraska	South Dakota	Arkansas	Mississippi	Minnesota	Michigan	Virginia	Pennsylvania	Connecticut
Base year	'39–'40	1940	1940	1940	1950	'40–'41	'38–'41	'49–'53	1940	1949	1940	'32–'41	1940	1940	'37–'41	1940	1940	'37–'41	1940	1939
1937.....	114	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	106.2	112.4	...	102.7	.....	.....	95.2	.....	.....
1938.....	99	.....	.....	.....	.....	.....	100.7	.....	.....	.....	.....	99.1	95.5	...	95.8	.....	.....	100.4	.....	.....
1939.....	101	.....	.....	.....	.....	.....	85.3	.....	.....	.....	.....	97.5	90.0	...	101.3	.....	94.5	96.1	.....	100.0
1940.....	99	100.0	100.0	100.0	.....	100.0	101.2	.....	.....	.....	100	93.2	100.0	100	100.4	100.0	100.0	95.8	100	93.9
'41.....	122	125.0	115.9	126.7	.....	100.0	113.0	.....	.....	.....	126	103.3	107.9	129	117.1	101.5	112.0	112.5	111	116.7
'42.....	158	157.5	156.8	174.5	.....	125.5	169.1	.....	.....	.....	178	171.4	159.8	181	158.8	145.1	138.0	149.1	138	141.1
'43.....	165	156.4	158.0	181.2	.....	125.5	193.8	.....	.....	.....	166	152.7	197.9	187	173.7	130.2	152.0	172.4	157	n.a.
'44.....	153	177.8	166.4	177.7	.....	125.5	144.0	.....	.....	.....	203	157.0	138.5	199	196.1	131.8	155.5	167.2	133	n.a.
'45.....	167	179.5	145.5	163.9	.....	121.7	187.4	.....	.....	.....	201	181.0	202.7	200	234.9	132.2	154.3	176.9	167	151.5
1946 Q 1.	156	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.	190	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3.	224	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.	217	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
'46.	...	179.7	186.9	163.0	.....	149.6	180.1	.....	.....	.....	186	162.4	177.6	205	163.4	147.1	155.8	198.9	171	170.1
1947 Q 1.	224	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.	216	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3.	219	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.	223	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
'47.	...	203.3	185.1	194.6	.....	167.5	186.6	.....	.....	.....	197	188.6	212.2	241	187.9	169.0	151.5	205.1	201	186.4
1948 Q 1.	220	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.	225	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	H1 196.9	.....	.....	.....	.....
3.	238	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.	231	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	H2 193.7	.....	.....	.....	.....
'48.	...	216.6	198.6	200.4	.....	191.6	178.7	.....	.....	.....	200	222.3	230.5	249	197.1	195.6	162.0	234.5	208	211.8
1949 Q 1.	207	.....	.....	.....	.....	.....	.....	92.4	M 198.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.	210	.....	.....	H1 226.9	.....	.....	.....	89.0	J 184.7	.....	.....	.....	.....	.....	.....	H1 166.3	.....	.....	.....	.....
3.	191	.....	.....	.....	.....	.....	.....	88.3	S 178.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.	187	.....	.....	H2 202.0	.....	.....	.....	88.7	D 168.9	.....	.....	.....	.....	.....	.....	H2 n.a.	.....	.....	.....	.....
'49.	...	190.7	181.1	.....	.....	180.7	179.2	89.8	180.7	100.0	167	207.1	217.0	236	182.7	160.0	149.0	203.6	193	184.6
1950 Q 1.	177	160.6	157.6	.....	.....	.....	.....	87.8	M 155.6	.....	.....	.....	177.8	.....	.....	.....	.....	.....	.....	.....
2.	195	180.0	162.2	H1 168.6	.....	.....	.....	89.9	J 161.8	.....	.....	.....	167.5	.....	.....	H1 147.5	.....	.....	.....	H1 170.8
3.	212	189.2	175.8	.....	.....	.....	.....	101.6	S 171.0	.....	.....	.....	179.5	.....	.....	.....	.....	.....	.....	.....
4.	218	194.8	187.4	H2 169.8	.....	.....	.....	106.2	D 179.7	.....	.....	.....	206.8	.....	.....	H2 154.0	.....	.....	.....	H2 185.0
'50.	...	176.7	.....	.....	100.0	180.0	210.5	97.3	166.5	83.3	169	191.3	176.3	229	175.5	148.5	151.5	190.8	192	.....
1951 Q 1.	243	215.4	187.7	.....	99.9	.....	.....	103.0	M 187.5	.....	.....	.....	189.3	.....	.....	.....	.....	.....	.....	.....
2.	250	238.3	193.6	H1 198.0	114.6	.....	.....	108.6	J 163.0	.....	.....	.....	254.6	.....	.....	H1 180.5	.....	.....	.....	H1 213.1
3.	256	221.9	201.0	205.4	106.5	.....	.....	105.9	S 185.5	.....	.....	.....	217.0	.....	.....	.....	.....	.....	.....	.....
4.	253	245.4	196.6	209.8	119.9	.....	.....	97.9	D 180.9	.....	.....	.....	268.0	.....	.....	H2 197.8	.....	.....	.....	H2 223.7
'51.	...	210.8	.....	.....	.....	192.4	206.1	104.0	182.0	90.8	209	223.7	229.4	279	206.5	185.3	173.0	247.1	216	.....
1952 Q 1.	239	224.8	197.0	192.7	93.9	.....	.....	100.5	M 191.9	.....	.....	.....	233.9	.....	.....	.....	.....	.....	.....	.....
2.	236	224.4	199.5	204.3	94.2	.....	.....	104.7	J 195.4	.....	.....	.....	216.6	.....	.....	H1 207.1	.....	.....	.....	H1 231.9
3.	239	221.2	205.4	211.4	93.8	.....	.....	109.4	S 193.6	.....	.....	.....	204.0	.....	.....	.....	.....	.....	.....	.....
4.	223	226.2	207.2	209.6	106.0	.....	.....	110.1	D 204.0	.....	.....	.....	206.5	.....	.....	H2 202.2	.....	.....	.....	H2 221.5
'52.	...	224.5	.....	.....	.....	187.3	248.7	105.6	192.3	101.9	236	231.6	212.6	313	227.4	203.0	177.0	258.4	205	.....
1953 Q 1.	243	218.3	176.3	199.8	104.9	.....	.....	110.0	M 167.2	.....	.....	.....	227.1	.....	.....	.....	.....	.....	.....	.....
2.	224	217.5	184.2	211.7	126.6	.....	.....	105.4	J 160.8	.....	.....	.....	210.0	.....	.....	H1 180.0	.....	.....	.....	H1 221.2
3.	231	218.0	184.1	212.2	108.5	.....	.....	97.1	S 172.2	.....	.....	.....	186.4	.....	.....	.....	.....	.....	.....	.....
4.	235	216.7	183.4	209.6	116.9	.....	.....	98.4	D 184.2	.....	.....	.....	206.8	.....	.....	H2 170.7	.....	.....	.....	H2 216.7
'53.	...	.....	.....	.....	.....	169.0	246.9	102.7	168.6	88.9	196	223.8	197.1	267	186.8	175.8	178.8	226.2	209	.....
1954 Q 1.	221	199.4	186.0	188.8	110.2	.....	.....	96.6	165.9	82.5	.....	.....	166.9	.....	.....	.....	.....	.....	.....	.....
2.	217	189.0	167.2	190.0	107.5	.....	.....	98.8	156.0	78.7	.....	.....	169.5	A 267	.....	H1 172.2	.....	.....	.....	H1 221.8
3.	220	207.8	160.1	190.6	92.8	.....	.....	95.6	165.2	86.0	.....	.....	168.6	S 252	.....	.....	.....	.....	.....	.....
4.	213	192.2	160.5	189.7	73.2	.....	.....	95.9	167.1	85.4	.....	.....	166.7	D 245	.....	H2 178.4	.....	.....	.....	H2 224.0
'54.	...	.....	.....	.....	.....	162.4	214.6	96.3	165.2	84.5	175	204.4	168.6	.....	195.0	174.9	168.0	203.8	208	.....
1955 Q 1.	217	189.3	156.1	173.0	104.6	.....	.....	94.7	163.9	78.3	.....	.....	154.9	.....	.....	H1 182.0	.....	.....	.....	.....
2.	237	212.4	170.0	183.0	110.1	.....	.....	99.0	178.1	83.1	.....	.....	172.8	.....	.....	.....	.....	.....	.....	.....

*H1 First Half *H2 Second Half *M March *A April *J June *S Sept *D Dec

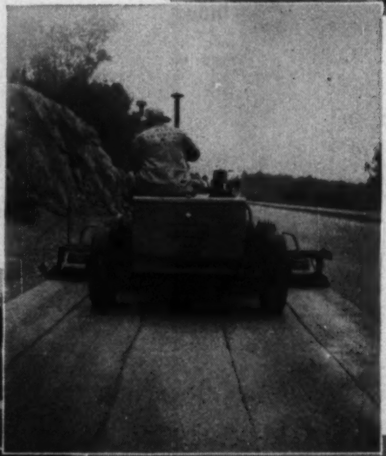
The *JACKSON* MULTIPLE VIBRATORY COMPACTOR

Used on the VAST MAJORITY of . .
IMPORTANT ROAD-BUILDING JOBS!

On all of the new toll roads and on dozens of other highway and airport building projects JACKSON MULTIPLE COMPACTORS are the predominant medium for consolidating the granular soil sub-bases and the base courses of sand, gravel, rock or slag in waterbound and penetration macadam construction. They're also very extensively and successfully used on large area fills of various other types.

The popularity of this equipment has grown by leaps and bounds as one contractor after another discovered that with it specified densities can be achieved with greater uniformity, more economically and in less than one-half the time required with equipment of other types. Moreover, the Jackson Multiple will get into places larger equipment cannot reach, and for the really tight spots, individual compacting units may be detached, fitted with operating handles and operated like a standard, self-propelled manually guided compactor.

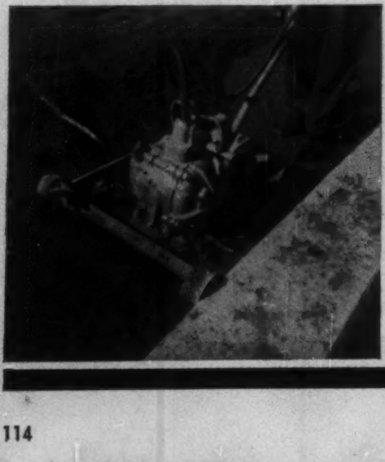
If you have any job requiring granular soil compaction, it will pay you to know specifically what Jackson Vibratory Compactors will do. See them at your nearby Jackson Distributor. Literature and Distributor's name on request.



As indicated by the adjacent photos, the JACKSON MULTIPLE is readily adaptable to widening projects of any width.

Jackson manually-guided, self-propelled vibratory compactors deliver 4200 2-TON blows per minute. Achieve specified density of granular soils in layers as thick as 10" at the rate of 1800 sq. ft. per hr.

One man can readily operate a twin hook-up of Jackson Compactors, thereby virtually doubling production. Current is usually supplied by power plant on auto trailer (single or twin unit) with hydraulic pick-up of Compactor.



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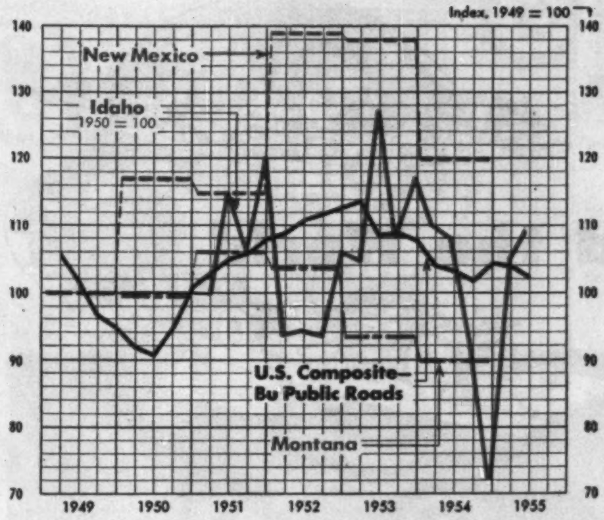
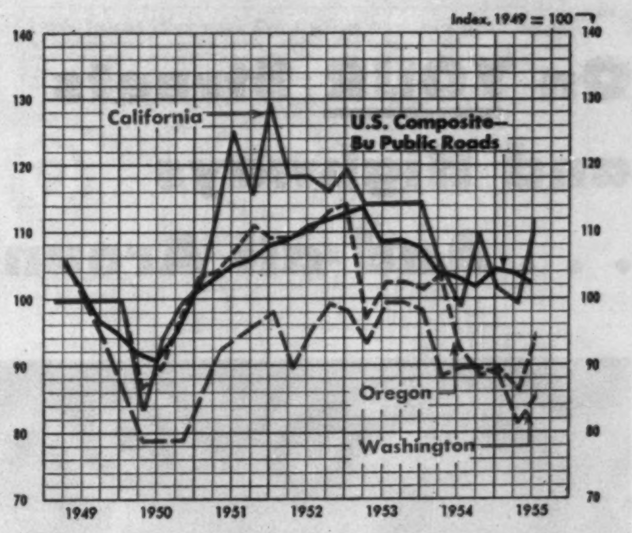
VIBRATORS, Inc.
LUDINGTON, MICHIGAN





• **Idaho** bases its composite highway price index on average prices bid on nine items. The Department of Highways points out how changing physical characteristics of highway jobs can help cause considerable ups or downs in a bid price index.

For instance, one project which accounted for about 50% of the total quantity of unclassified excavation contracted for in the second quarter of '55 had an unusually high percentage of solid rock. This pushed the average price for unclassified excavation sharply above the first quarter. Furthermore, the use of crushed rock instead of crushed gravel on some jobs raised the cost per mile of road mix and the use of quarry rock instead of crushed gravel increased average bid prices for crushed surfacing.

Idaho, Average Contract Unit Prices and Index

Year	Excav uncl $/cy	Sprink-ling $/Mgal	Roll-ing $/hr	Crush surf $/t	Asph all gr $/gal	Road-Mix $/mi	Plant Mix $/t	Conc. Cl A $/cy	Reinf. steel $/lb	Comp. Index '50 = 100
'50.....	$0.618	$1.11	$4.06	$0.95	$0.129	$2,592.42	$1.92	$54.17	$0.112	100.0
'51 Q 1.	0.586	0.85	4.56	0.95	0.130	1,858.76	3.30	54.69	0.123	99.9
Q 2.	0.536	1.09	4.09	1.03	0.139	2,954.16	3.90	50.18	0.115	114.6
Q 3.	0.522	1.30	4.93	1.17	0.142	2,600.32	3.24	60.00	0.160	108.5
Q 4.	0.656	1.46	5.02	1.22	0.145	2,259.81	3.90	.....	.....	119.9
'52 Q 1.	0.407	1.02	3.77	1.07	0.156	2,938.07	.....	56.02	0.150	93.9
Q 2.	0.495	0.99	4.64	1.15	0.139	2,983.59	4.04	66.10	0.129	94.2
Q 3.	0.345	1.08	4.79	1.00	0.152	1,903.47	2.84	58.44	0.127	93.8
Q 4.	0.613	1.15	4.67	0.90	0.155	....	5.43	66.95	0.138	106.0
'53 Q 1.	0.506	1.22	4.22	1.00	0.144	2,977.37	4.56	64.71	0.134	104.9
Q 2.	0.574	1.70	5.00	1.26	0.147	4,214.41	.....	69.73	0.152	126.6
Q 3.	0.410	1.31	3.85	0.90	0.160	2,985.71	3.45	63.41	0.136	108.5
Q 4.	0.553	1.16	3.76	1.17	0.189	3,835.49	3.80	61.39	0.126	116.9
'54 Q 1.	0.448	0.57	3.83	0.80	0.154	1,340.60	3.92	51.17	0.146	110.2
Q 2.	0.426	1.31	4.86	1.26	0.124	2,047.42	2.91	58.97	0.111	107.5
Q 3.	0.296	0.96	4.15	0.96	0.150	3,192.20	2.84	59.90	0.119	92.8
Q 4.	0.342	0.54	3.31	0.64	0.135	2,166.80	2.00	56.45	0.122	73.2
'55 Q 1.	0.333	1.33	4.76	0.932	0.163	2,686.12	3.85	72.25	0.1413	104.6
Q 2.	0.612	0.955	4.57	0.989	0.156	3,309.92	3.47	63.67	0.14	110.1

Oregon, Composite and Sub-Indexes—1940 = 100

Year	Grading	Cr rock surface	Bit mac surface	Asph conc pavement	Port cmt conc pave	Conc bridge & structs	Composite index
1940......	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1941......	108.2	127.7	117.7	112.2	120.2	115.2	115.9
1942......	181.2	187.5	125.9	141.1	164.5	160.3	156.8
1943......	164.7	175.9	167.5	146.2	208.8	156.5	158.0
1944......	202.4	199.2	147.3	125.3	166.4	184.1	166.4
1945......	159.2	163.9	139.4	118.3	141.1	199.3	145.5
1946......	171.0	175.1	147.8	116.6	155.0	205.5	155.9
1947......	211.2	183.5	160.5	118.3	215.2	247.1	185.1
1948......	218.1	193.9	174.7	151.6	235.8	272.2	198.6
1949......	181.0	169.6	173.4	145.6	231.1	250.0	181.1
'50 Q 1...	133.9	150.6	156.1	115.7	227.8	243.1	157.6
Q 2...	132.8	174.9	158.5	127.1	227.8	210.0	162.2
Q 3...	154.6	177.8	174.6	136.9	228.8	241.3	175.8
Q 4...	155.7	190.8	185.7	135.9	227.8	276.4	187.4
'51 Q 1...	190.8	180.9	184.5	124.5	227.8	269.0	187.7
Q 2...	174.5	192.8	192.2	130.1	227.8	289.1	193.6
Q 3...	186.8	213.7	210.8	123.9	240.5	265.9	201.0
Q 4...	210.0	191.6	190.9	130.5	243.6	277.2	196.6
'52 Q 1...	197.8	198.1	187.0	127.3	243.6	278.5	197.0
Q 2...	191.1	210.4	177.3	135.3	243.6	280.0	199.5
Q 3...	201.8	218.8	187.7	131.9	243.6	301.1	206.4
Q 4...	202.9	219.3	188.8	137.3	243.6	282.7	207.2
'53 Q 1...	187.4	160.6	186.3	115.5	221.5	247.6	176.3
Q 2...	170.8	179.1	181.9	119.9	236.1	281.4	184.2
Q 3...	173.4	184.7	184.9	116.3	234.2	266.9	184.1
Q 4...	162.0	191.0	179.7	113.7	237.3	271.7	183.4
'54 Q 1...	163.5	191.2	182.3	121.1	239.2	275.9	186.0
Q 2...	158.7	146.2	170.1	119.5	239.0	264.4	167.2
Q 3...	156.2	159.0	162.8	101.0	241.1	240.8	160.1
Q 4...	150.2	142.6	165.0	100.8	240.5	264.5	160.5
'55 Q 1...	146.0	123.4	176.3	102.6	240.8	269.1	158.1
Q 2...	154.9	152.6	183.8	118.8	241.3	267.2	170.0

California, Average Highway Prices, Highway and Bridge Price Indexes

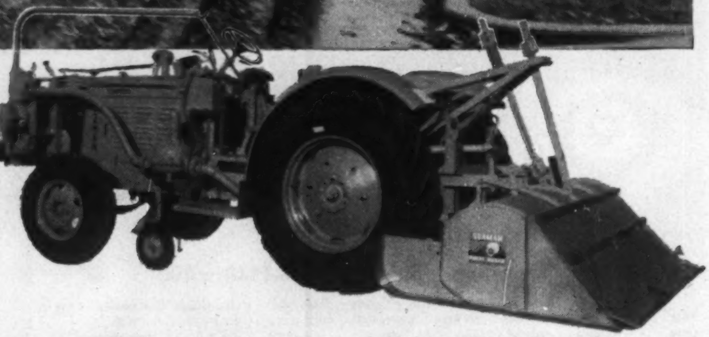
Year	Rdwy excav $/cy	Crush run base $/t	Plant mix surf $/t	Asph conc pave $/t	PCC pave-ment $/cy	PCC struc-tures $/cy	Bar reinf steel $/lb	Struc-tural steel $/lb	Price Indexes Hwy const '40 = 100	Price Indexes Bridge const '39-'40 = 100
1940.......	$0.22	$1.54	$2.19	$2.97	$7.68	$18.33	$0.040	$0.083	100.0	99
1941.......	0.26	2.31	2.84	3.18	7.54	23.31	0.053	0.107	125.0	122
1946.......	0.41	2.45	4.00	4.68	9.48	37.38	0.060	0.099	179.7	197†
1948.......	0.55	2.43	4.30	5.38	13.04	49.86	0.092	0.126	216.6	229†
1949.......	0.49	2.67	4.67	4.64	12.28	48.67	0.096	0.117	190.7	199†
'50 Q 1....	0.34	2.22	3.65	3.74	.....	40.15	0.077	0.081	160.6	177
2....	0.40	2.13	4.48	3.74	10.86	43.03	0.080	0.105	180.0	195
3....	0.41	2.32	4.25	5.50	10.91	44.34	0.093	0.131	189.2	212
4....	0.42	2.81	4.64	4.61	12.55	43.18	0.098	0.120	194.8	218
'51 Q 1....	0.45	3.07	4.06	5.22	11.71	46.38	0.103	0.206	215.4	243
2....	0.63	3.88	4.56	4.63	12.93	51.50	0.105	0.166	238.3	250
3....	0.56	2.88	4.59	3.90	12.41	46.14	0.107	0.165	221.9	256
4....	0.66	2.91	5.66	4.89	12.71	49.38	0.105	0.169	245.4	253
'52 Q 1....	0 56	3.25	4.88	4.77	14.25	47.46	0.094	0.152	224.8	239
2....	0.53	3.19	5.29	4.13	14.20	49.12	0.091	0.143	224.4	236
3....	0.55	2.61	5.49	4.60	12.80	48.21	0.094	0.132	221.2	239
4....	0.66	2.68	4.97	.....	12.53	48.45	0.094	0.128	226.2	223
'53 Q 1....	0.45	2.48*	5.27	4.46	12.47	53.19	0.098	0.150	218.3	243
2....	0.50	2.07	5.38	4.59	13.06	52.68	0.091	0.132	217.5	224
3....	0.54	2.15	5.30	4.82	13.78	49.23	0.092	0.129	218.0	231
4....	0.48	2.11	4.74	4.47	14.77	53.41	0.105	0.139	216.7	235
'54 Q 1....	0.45	2.28	4.23	4.78	14.89	47.52	0.092	0.126	199.4	221
2....	0.38	2.09	4.29	5.18	14.28	47.12	0.093	0.114	189.0	217
3....	0.43	1.85	4.68	7.00	12.63	49.59	0.095	0.167	207.8	220
4....	0.35	1.78	4.83	.....	13.13	46.08	0.094	0.135	192.2	213
'55 Q 1....	0.39	1.69	4.55	.....	13.44	40.66	0.095	0.140	189.3	217
2....	0.42	1.99	5.39	.....	14.46	51.36	0.098	0.136	212.4	237

† average of quarterly values * untrdt rock base substituted for crusher run at this point

The bridge price index is based on these items, quantities and weighted average 1939-40 prices:

Items	Quan-tities	1939-40 prices	Items	Quan-tities	1939-40 prices
Structure excavation..cy	156,286	$1.560	Misc iron and steel...lb	766,630	$0.138
Cl "A" portl cmt concr,			Bar reinf steel........lb	35,958,000	0.040
structure............cy	176,634	18.420	Furn steel piling.......lf	79,329	1.790
footing block........cy	12,774	12.040	Furn concr piling.......lf	146,861	1.600
Struct steel,			Driving steel piling...ea	2,313	25.290
plate girder..........lb	5,810,000	0.077	Driving concr piling...ea	3,781	40.840
rolled beam..........lb	4,953,000	0.063	Steel bridge railing....lf	21,709	5.930
truss................lb	7,884,000	0.099	Concr bridge railing...lf	42,976	1.910

On YOUR Streets and Highways . . . And all Around the World



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- And it operates at the lowest cost per square yard in *any* stabilized construction.

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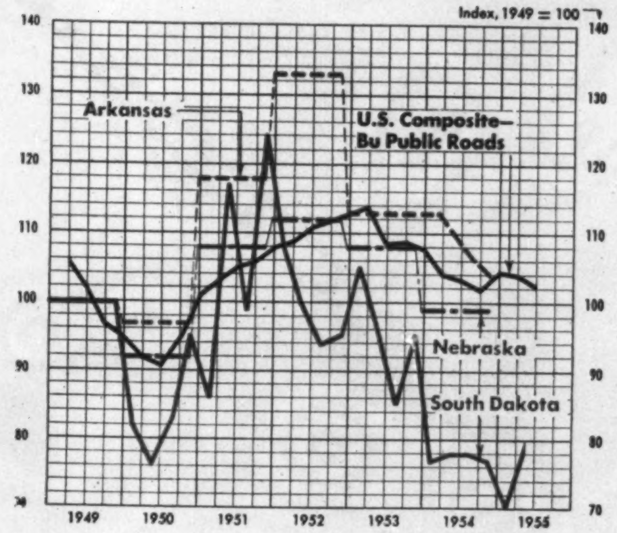

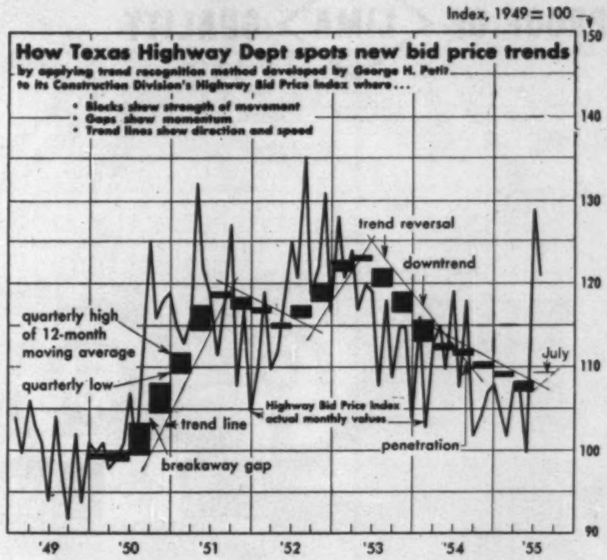

South Dakota, Average Unit Prices and Price Index

	Road-way excav. $/cy	Cr. grav. surf. $/t	Liq. asph. $/gal	Plt. mix bit. surf. $/t	Conc. Cl A $/cy	Reinf. steel $/lb	Struct. steel $/lb	Composite Index '40=100
1940......	$0.120	$0.59	$0.078	$1.49	$19.11	$0.044	$0.050	100.0
1941......	0.128	0.64	0.087	.....	19.52	0.049	0.054	107.9
1942......	.....	0.92	0.131	.....	.....	.....	.....	159.8
1943......	0.299	1.06	0.117	.....	21.62	0.061	0.400	197.9
1944......	.....	0.88	0.096	.....	.....	.....	.....	138.5
1945......	0.270	1.21	0.106	.....	38.69	0.078	0.096	202.7
1946......	0.214	1.13	0.101	2.91	38.49	0.085	0.095	177.6
1947......	0.235	1.35	0.140	3.49	46.22	0.113	0.128	212.2
1948......	0.246	1.40	0.169	3.92	53.26	0.129	0.149	230.5
1949......	0.197	1.40	0.159	3.83	54.01	0.125	0.135	217.0
'50 Q 1...	0.166	0.93	.....	.....	53.37	0.115	0.137	177.8
2...	0.171	0.88	0.139	2.17	49.54	0.114	0.135	167.5
3...	0.174	0.97	0.135	2.86	58.21	0.127	0.141	179.5
4...	0.199	1.05	0.111	3.00	51.33	0.136	0.681	206.8
'50...	**0.175**	**0.95**	**0.135**	**2.74**	**53.13**	**0.123**	**0.139**	**176.3**
'51 Q 1...	0.187	1.12	0.146	3.35	57.21	0.154	0.160	189.3
2...	0.418	1.17	0.151	4.04	.....	.....	.....	254.6
3...	0.209	1.29	0.158	3.92	66.10	0.137	0.162	217.0
4...	0.367	1.05	0.146	.....	64.03	0.152	0.500	268.0
'51...	**0.271**	**1.21**	**0.154**	**3.94**	**63.95**	**0.146**	**0.164**	**229.4**
'52 Q 1...	0.231	1.51	0.161	.....	53.39	0.149	0.152	233.9
2...	0.263	1.10	0.151	3.25	56.81	0.133	0.155	216.6
3...	0.246	0.97	0.147	2.63	55.30	0.148	0.170	204.0
4...	0.218	1.31	0.135	2.54	55.47	0.143	0.178	206.5
'52...	**0.242**	**1.18**	**0.146**	**2.89**	**55.37**	**0.141**	**0.160**	**212.6**
'53 Q 1...	0.309	1.07	0.142	4.21	62.91	0.115	0.450	227.1
2...	0.259	1.19	0.139	2.54	52.57	0.136	0.160	210.0
3...	0.186	1.20	0.138	2.01	47.39	0.138	0.143	186.4
4...	0.258	1.13	0.128	2.49	52.99	0.117	0.149	206.8
'53...	**0.215**	**1.15**	**0.138**	**2.63**	**51.54**	**0.129**	**0.147**	**197.1**
'54 Q 1...	0.157	1.03	0.120	2.37	46.15	0.110	0.168	166.9
2...	0.163	0.94	0.126	2.34	49.62	0.118	0.155	169.5
3...	0.164	0.93	0.120	2.24	51.75	0.127	0.133	168.6
4...	0.189	0.91	0.113	2.16	49.62	0.121	0.135	166.7
'54...	**0.171**	**0.95**	**0.121**	**2.26**	**49.23**	**0.119**	**0.146**	**168.6**
'55 Q 1...	0.162	0.80	0.120	2.01	49.33	0.109	0.146	154.9
2	0.176	0.95	0.129	2.52	47.79	0.119	0.169	172.8

Index Record 1919–1939

Year		Year		Year		Year	
1919......	286.3	1925.....	158.2	1930.....	142.2	1935.....	117.3
1920......	341.8	1926.....	144.7	1931.....	127.2	1936.....	138.4
1921......	282.4	1927.....	149.2	1932.....	113.5	1937.....	112.4
1922......	162.0	1928.....	145.3	1933.....	102.4	1938.....	95.5
1923......	193.7	1929.....	150.6	1934.....	125.9	1939.....	90.0
1924......	175.5						

• **South Dakota's** highway price index is based on seven bid items and is corrected for an upward bias that could be caused by substantial changes over the years in their relative quantities. This is probably the most sophisticated index of those included in this section.

The South Dakota Highway Commission uses "Fischer's Ideal Index" formula for computing its composite index. This is the root mean square of two weighted aggregate type indexes, the difference between these two indexes being in the percentage weights applied to each bid item.

In the first aggregative index, the percentage weights are based on average quantities contracted for during the four years 1950–53. These average quantities are multiplied by the average unit price for each item in 1940 to get a value weight for each item. These value weights are then converted into percentage weights based on the sum of the value weights for all of the items.

Next, the average bid prices of contract items for each period (annually 1919-49 and quarterly from 1950 to date) are reduced to relatives of the 1919 base year prices. These price relatives are then multiplied by the percentage weights and summed up to get the composite index for each period.

The second aggregative index is computed in a similar way except that two additional sets of percentage weights are computed from value weights in two other periods. Average annual quantities for the years 1923-26 are used to compute weights to get the price index for the years 1919-30. Likewise, average annual quantities for the 1937-40 period are used to compute weights and the price indexes for the years 1931-45. The same weights used for the first aggregative index also serve the second index but are used only for the period 1946 to date and, in the opinion of the Highway Commission, can probably be used for a number of years to come.

• **Texas** has revised its highway bid price index since ENR first described it (ENR Oct. 7, 1954, p. 123). The new index is calculated by re-figuring a project which cost $100,000 at the average prices and quantities of highway jobs let in the five-year period 1949-53. The old index was based on 1949 only.

The Highway Department feels that the broader base of 1949-53, which draws on a wealth of data representing more than $500 million in highway construction, gives the Department a better picture of the price trend.

The chart above shows how Texas adapts for its own use the method of recognizing cost trends originally developed by George H. Petit of Hartford, Conn. (ENR Sept. 4, 1952, p. 98). This method uses the quarterly highs and lows of the 12-month moving average of the cost index to form blocks. These blocks show graphically the strength of the Texas highway cost movements from 1950 to date. When a block penetrates the trend lines connecting preceding blocks, it means that the cost trend is changing it's speed or direction. The third quarter '55 block is not complete, but the gap between the thin line at July and the top of the second quarter block points to a reversal of the '53-'55 downtrend in bid prices.

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says William Wortman, Stuttgart, Arkansas Contractor

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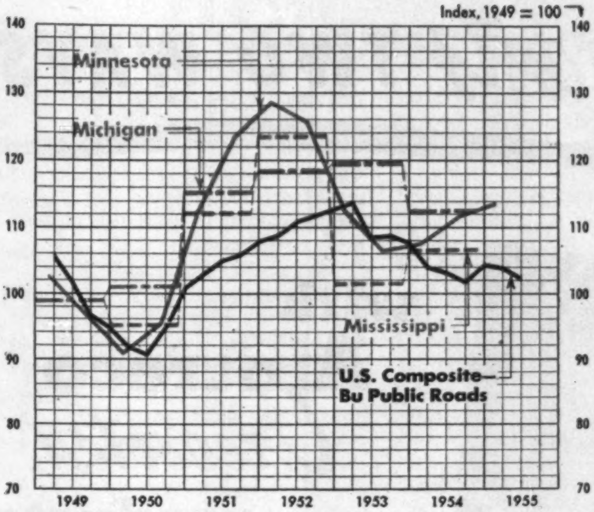

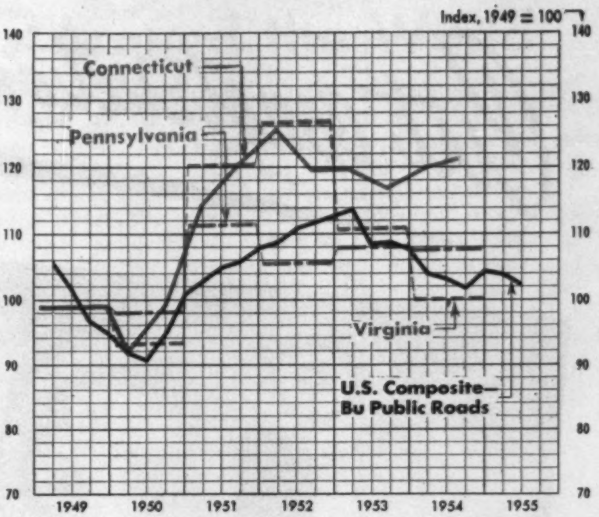

Mississippi, Average Unit Prices and Index—'37-'41—100

	Grading		Drainage	Cement concrete pavement				Bit pavement	
Year	Exc, uncl ᵃ $/cy	Topping ᵃ $/cy	B conc culv ᵇ $/cy	Plain cmt $/sy	7–5–7″ RCC $/sy	8–6–8″ RCC $/sy	9–6–9″ RCC $/sy	Asph, prime $/gal	Cover mtls $/cy
1940	0.212	0.42	20.48	1.34	1.51	1.76	1.68	0.094	4.55
1941	0.250	0.42	25.61	1.71	2.20	2.58	2.50	0.072	....
1942	0.398	0.41	32.60	2.62	2.32	2.73	2.65	0.17	....
1943	0.267	1.26	27.98	3.25	2.44	2.88	2.81	0.179	6.00
1944	0.567	1.07	32.58	2.44	2.55	3.04	2.97	0.125	5.50
1945	0.671	1.21	38.66	2.58	2.95	3.47	3.36	....	....
1946	0.311	0.62	42.46	2.72	2.28	2.38	2.49	0.11	5.25
1947	0.345	0.72	47.80	3.96	2.26	3.00	3.17	0.139	6.55
1948	0.325	0.79	48.41	3.80	2.78	2.82	2.95	0.17	7.03
1949	0.312	0.71	45.852	3.64	2.99	3.269	3.291	0.155	7.076
1950	0.260	0.797	42.16	3.50	2.78	4.00	2.57	0.165	6.72
1951c	0.320	0.78	52.87	....	3.90	....	3.39	0.17	6.77
1952	0.410	0.82	50.43	....	3.83 ᵈ	....	....	0.17	6.85
1953	0.286	0.73	50.58	....	3.25 ᵈ	....	2.74 ᵉ	0.156	6.16
1954	0.307	0.84	47.72	....	2.79 ᵈᵉ	3.61 ᵈᵉ	3.18 ᵈᵉ	0.162	6.59
Base prices	34.8%		8.2%	20.2%				9.6%	
'37–41	0.235	0.346	20.53	1.64	1.48	none	1.60	0.094	4.56
Sub wgt %	64.1	35.9	8.2	0.3	34.8	1.6	63.3	50.3	49.7

*a incl haul *b incl D conc *c first half of yr only *d convrtd from 6″ uniform

	Gravel		Structures						Composite Index
Year	Surf course $/cy	Stab aggr $/cy	Conc, B&C bri $/cy	Reinf stl, bri $/lb	Str stl $/lb	Timber, treated $/Mbm	Piling, timb ᶠ $/lf	Piling stl $/lf	100
1940	2.18	1.56	23.36	0.04	0.05	124.88	1.04	....	100.36
1941	1.91	0.81	27.98	0.05	0.06	139.30	1.25	....	117.07
1942	3.00	....	34.27	0.067	0.09	249.73	1.88	....	158.79
1943	....	....	30.35	0.06	0.094	176.00	1.54	....	173.68
1944	2.43	....	33.17	0.143	0.098	200.00	2.29	....	196.18
1945	4.00	....	60.00	0.09	0.10	205.55	2.31	....	234.88
1946	2.85	4.25	41.22	0.07	0.085	211.11	2.34	3.21	163.42
1947	2.55	4.43	49.96	0.09	0.112	237.50	2.37	3.93	187.91
1948	3.08	4.41	54.66	0.11	0.127	276.04	2.63	3.71	197.10
1949	2.337	2.218	46.534	0.102	0.114	232.91	2.133	2.735	182.69
1950	2.385	3.86	43.945	0.098	0.119	222.12	1.98	3.319	175.48
1951*	2.70	3.74	55.07	0.123	0.144	275.26	2.27	4.10	206.49
1952	2.13	3.99	59.00	0.123	0.156	277.78	2.25	5.44	227.35
1953	2.94	4.09	48.80	0.11	0.134	253.31	1.90	3.98	186.75
1954	2.66	4.40	49.23	0.12	0.13	290.24	1.95	3.91	195.00
Base prices	4.1%		23.1%						
'37–41	1.98	1.67	23.04	0.043	0.052	121.27	1.19	1.80	100.00
Sub wgt %	32.1	67.9	44.9	12.4	27.1	1.5	6.6	7.5	

*e convrtd from 8″ uniform *f creo *SI sub index

Virginia Highway Prices and Price Index

	Excavation		Surfacing		Structures			Composite Mile Index
Year	$/cy	Sub-Index	$/cy	Sub-Index	Reinf. Steel $/lb	Struct. Conc. $/cy	Sub-Index	
1937–41	$0.398	100.0	$1.012	100.0	$0.0494	$22.13	100.0	100.0
1937	$0.29	102.8	$0.91	89.9	$0.0500	$19.90	92.3	95.2
1938	0.29	102.8	1.02	100.8	0.0480	21.10	95.7	100.4
1939	0.25	88.7	1.02	100.8	0.0460	22.40	99.5	96.1
1940	0.25	88.7	1.04	102.8	0.0468	21.05	95.0	95.8
1941	0.33	117.0	1.07	105.7	0.0562	26.20	117.4	112.5
1942	0.46	163.1	1.33	131.4	0.0700	35.88	157.8	149.1
1943	0.57	502.1	1.50	148.2	0.0660	39.23	167.9	172.4
1944	0.49	173.8	1.55	153.2	0.0700	42.58	181.6	167.2
1945	0.55	195.0	1.53	151.2	0.0700	45.93	193.5	176.9
1946	0.53	187.9	2.05	202.6	0.0790	49.36	209.6	198.9
1947	0.55	195.0	2.00	197.6	0.0940	54.39	233.9	205.1
1948	0.67	237.6	2.26	223.3	0.1110	56.58	249.1	234.5
1949	0.55	195.0	2.01	198.6	0.1040	50.92	225.9	203.6
1950	0.55	195.0	1.66	164.0	0.1051	52.30	231.3	190.8
1951	0.71	251.8	2.00	197.6	0.1400	74.88	326.6	247.1
1952	0.77	273.0	2.00	197.6	0.1457	78.52	342.0	258.4
1953	0.61	216.3	2.01	198.6	0.1279	66.07	290.1	226.2
1954	0.48	170.2	2.00	197.6	0.1229	60.39	267.7	203.8

Connecticut, Contract Price Index and Sub-Indexes, 1939 = 100.

Date	Structures	Grading drainage	Trunk line	Concrete pavement	Town aid	Composite
1939	100.00	100.00	100.00	100.00	100.00	100.00
1940	93.76	94.19	92.78	98.54	86.41	93.93
1941	128.27	110.00	115.14	106.92	108.94	116.66
1942	139.83	130.00	156.21	129.89	142.75	141.06
1943	......	......	......	......	......	......
1944	......	......	......	......	......	......
1945	138.65	175.09	160.97	138.04	168.62	151.47
1946	163.34	177.27	192.20	132.95	207.09	170.08
1947	180.34	217.98	193.44	147.76	234.24	186.44
1948	228.17	231.36	198.27	198.31	190.28	211.81
1949	196.49	184.51	171.42	190.96	163.09	184.64
Jun '50	174.09	182.77	166.05	167.95	160.65	170.82
Dec '50	195.10	197.82	173.02	184.15	163.36	184.98
Jun '51	235.69	234.30	179.83	213.20	193.70	213.13
Dec '51	252.43	239.35	185.82	226.63	195.51	223.70
Jun '52	267.63	249.80	191.92	221.24	212.13	231.91
Dec '52	243.75	234.06	192.07	216.57	216.61	221.45
Jun '53	239.88	232.88	194.06	221.70	212.35	221.22
Dec '53	235.74	225.04	191.60	216.46	207.25	216.74
Jun '54	243.38	228.84	195.22	220.31	210.78	221.75
Dec '54	244.96	230.03	198.27	222.94	214.08	224.01

Pennsylvania, Weighted Average Unit Prices and Index

	Excavation		Cr aggr base 8″	Bit surf DP-1	RCC pvmt 9″	Concrete		Reinf steel bars	Annual Index
Year	Cl 1 $/cy	Cl 2 $/cy	$/sy	$/sy	$/sy	Cl A $/cy	Cl B $/cy	$/lb	'40 = 100
1935	$0.494	$1.470	$0.736	$0.561	$2.729	$18.660	$15.167	$0.041	...
1936	0.555	2.060	0.784	0.646	2.556	20.08	16.53	0.044	...
'37 H1	0.563	2.445	0.920	0.749	2.536	21.99	18.169	0.053	...
H2	0.480	1.724	0.820	0.692	2.667	18.82	17.280	0.051	...
'38 H1	0.549	1.767	0.775	.....	2.951	20.738	16.667	0.048	...
H2	0.397	1.635	0.640	0.756	2.344	20.039	14.843	0.039	...
'39 H1	0.571	1.960	0.739	.....	2.740	20.43	15.68	0.046	...
H2	0.474	1.640	0.701	.....	2.430	20.96	17.68	0.047	...
'40 H1	0.449	1.779	0.799	0.734	2.586	22.151	18.059	0.044	...
H2	0.417	1.680	0.808	0.695	2.515	22.522	17.601	0.045	100
'41 H1	0.471	1.941	0.870	0.700	2.674	24.65	19.690	0.052	...
H2	0.560	2.446	0.919	0.779	2.715	27.642	20.642	0.057	111
'42 H1	0.622	3.403	1.108	1.084	.....	29.391	29.549	0.061	...
H2	0.866	3.500	1.200	1.102	.....	32.975	25.163	0.073	138
'43 H1	0.927	4.872	1.271	.....	.....	39.088	34.101	0.061	...
H2	0.779	2.653	1.394	.....	.....	38.405	31.076	0.067	157
'44 H1	0.647	2.943	1.184	.....	3.111	40.00	30.506	0.071	...
H2	0.604	3.234	1.248	.....	3.075	36.81	26.882	0.056	133
'45 H1	1.436	2.850	1.409	.....	3.835	26.105	22.484	0.069	...
H2	0.916	3.940	2.681	1.200	3.258	44.108	36.159	0.082	167
'46 H1	0.833	3.308	1.667	1.007	3.796	48.785	41.397	0.079	...
H2	0.948	3.844	1.752	1.284	3.995	44.397	37.776	0.074	171
'47 H1	1.095	4.003	1.878	1.305	4.299	52.448	43.836	0.090	...
H2	1.087	6.257	1.919	1.160	4.815	50.772	42.860	0.103	201
'48 H1	1.002	4.137	1.913	1.253	4.801	64.605	51.285	0.111	...
H2	1.022	6.364	1.924	1.415	4.951	66.885	48.089	0.109	208
'49 H1	0.965	4.042	1.986	1.241	4.985	75.156	45.747	0.113	...
H2	0.834	3.823	1.771	1.199	4.744	54.13	40.820	0.108	193
'50 H1	0.713	3.089	1.676	1.211	4.674	49.093	38.971	0.100	...
H2	0.819	3.675	1.742	1.100	4.971	55.208	41.90	0.106	192
'51 H1	0.921	4.049	1.867	1.500	6.154	61.092	49.547	0.127	...
H2	0.851	3.866	1.913	1.422	5.518	56.353	46.452	0.121	218
'52 H1	0.880	3.722	1.716	1.409	4.923	54.554	48.097	0.117	...
H2	0.912	4.017	1.902	1.277	5.150	62.451	48.891	0.125	205
'53 H1	0.787	4.048	1.930	1.176	5.138	58.440	46.728	0.123	...
H2	0.918	3.941	1.760	1.151	5.216	70.220	46.606	0.123	209
'54 H1	0.826	3.356	1.907	1.258	5.088	49.685	46.903	0.119	...
H2	1.059	2.749	1.419	1.240	5.175	52.092	34.680	0.116	208
'55 H1	0.604	2.664	1.764	0.950	5.333	48.868	43.488	0.114	...

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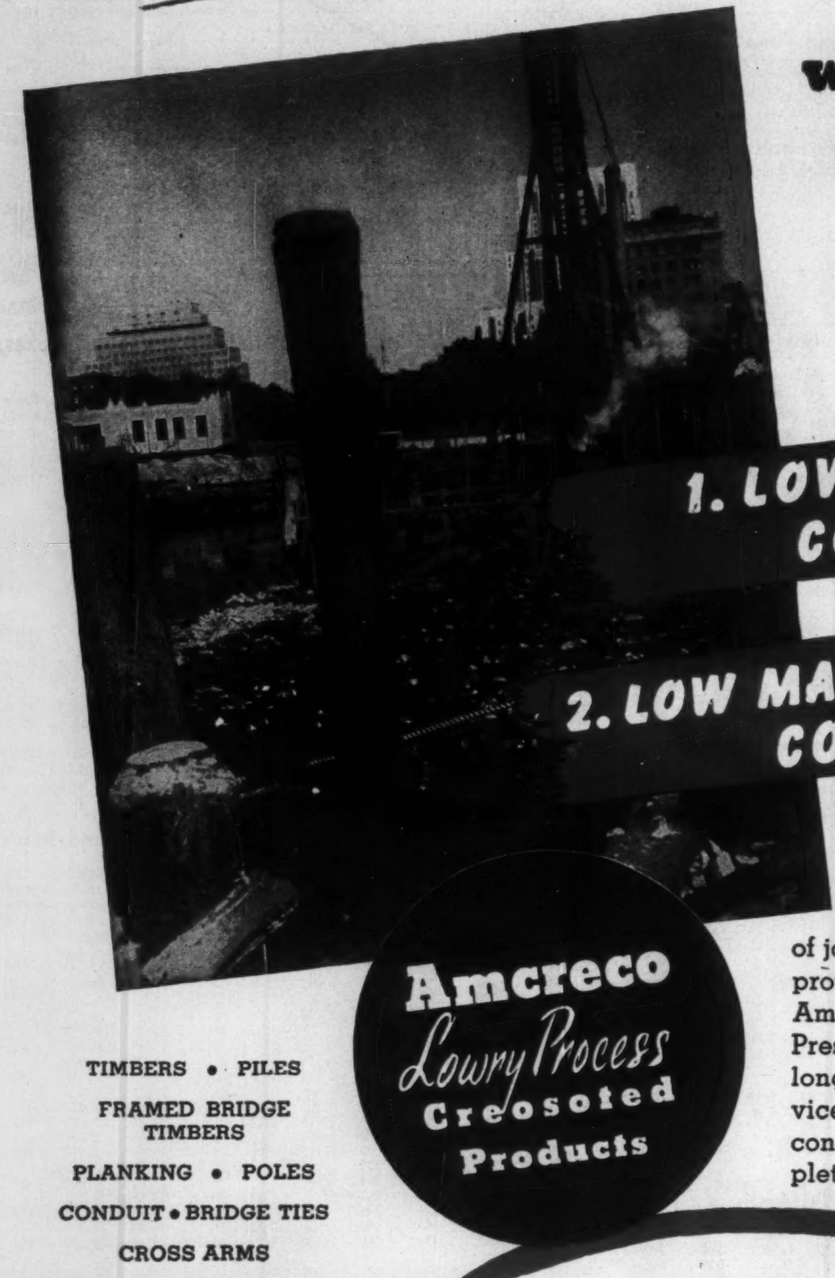

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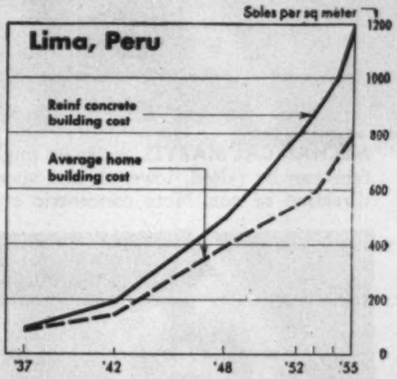
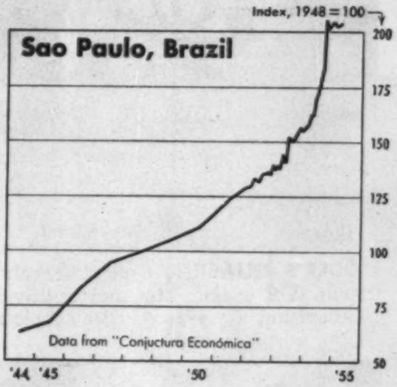
Construction Cost Trends Around the World

- **Anchorage, Alaska,** has a good supply of construction materials, unskilled and skilled labor. Utility and heavy construction is higher this year than last, but building construction is lower. At the time of ENR's report, carpenters were negotiating a new contract. They were asking for a 25-cent per hour raise but ENR sources estimated they would get from seven to ten cents more per hour, the same that other crafts have signed for this year.
- **San Juan, Puerto Rico,** has a good supply of construction materials and labor is plentiful. Construction activity is rising this year.
- **Bogota, Colombia,** is concerned about price increases for construction materials which have to be imported. Iron is short and the price is up sharply. The same is true for building equipment and construction machinery.
- **Buenos Aires, Argentina,** reports construction activity at a low ebb in June '55. While supplies of most construction materials were sufficient during the first half of this year, there were spot shortages of cement, broken stone and certain types of brick.
- **Caracas, Venezuela,** is suffering from a shortage of reinforcing steel which has forced the price up considerably. The supply of other construction materials is good except structural steel shapes which are not stockpiled here. The labor supply continues to improve, though skilled labor is still not plentiful.
- **Ciudad Trujillo, Dominican Rep.,** has an adequate supply of construction materials and there is no labor shortage. Point Four Schools are reported doing an excellent job in developing labor skills. Construction activity is running well above the '54 level largely because of work on the projected International Fair, tourist housing and government construction projects. Rentals show a better than normal return on investment. Construction costs have changed very little in the past year. Steady prices of materials imported from Europe, have helped keep materials costs at the same level as a year ago.
- **La Paz, Bolivia,** has severe shortages of construction materials. Black market purchases have become almost the normal way for contractors to get needed materials. Scarcities are limited to private work and are caused by lack of foreign exchange. Private construction is off 30% from last year. In contrast, public works have no problem because imports are state-sponsored. Public construction is budgeted 400% higher this year than last, with most of the expenditures going for the government industrial diversification program, the Cochabamba-Oruro-La Paz pipeline and another pipeline to the Chilean Pacific coast.
- **Lima, Peru,** reports little change in the construction picture from last year. Free exchange and no trade restrictions have resulted in a good supply of materials. A new cement plant with an initial capacity of 1,500 bbl/day has come into production south of Lima. Two more plants are now under construction in northern Peru. These plants will help the cement supply picture which has been so poor that cement had to be imported for large jobs. Unskilled labor is in good supply, but skilled is still short. Building continues brisk in Lima. Although construction workers' salaries are unchanged from last year, contractors have to pay 50% more for new government taxes, compensation insurance and other charges.
- **Montevideo, Uruguay,** reports materials in good supply excepting Portland cement. Housing construction has declined this year and building as a whole is estimated to be running about 20% below '54.
- **Santiago, Chile,** has a scarcity of nails and roofing materials while deliveries are spotty for cement, gravel, sand, steel and tiles. Unskilled labor is plentiful but skilled is scarce. Construction activity this year is running about 10% ahead of '54. Costs are up sharply—in the neighborhood of 70% higher than a year ago.
- **Sao Paulo, Brazil,** construction activity has declined in the first half of '55 and prices of construction materials softened. However, most materials prices are still higher than they were a year ago. Tight money and credit in Sao Paulo has slowed construction schedules and stretched out completion of many buildings which should have been completed many months ago.





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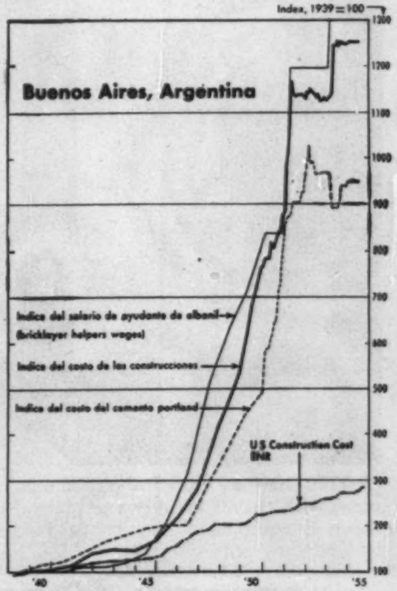
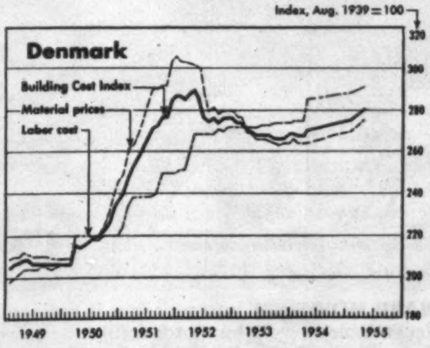
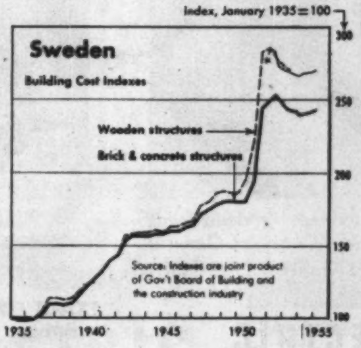
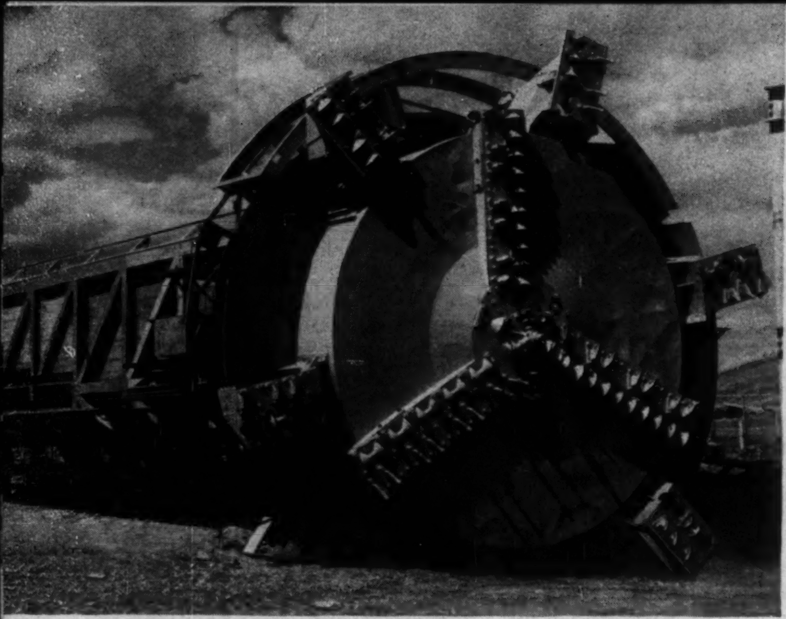


Source: Construcciones, published by Camara Argentina de la Construccion

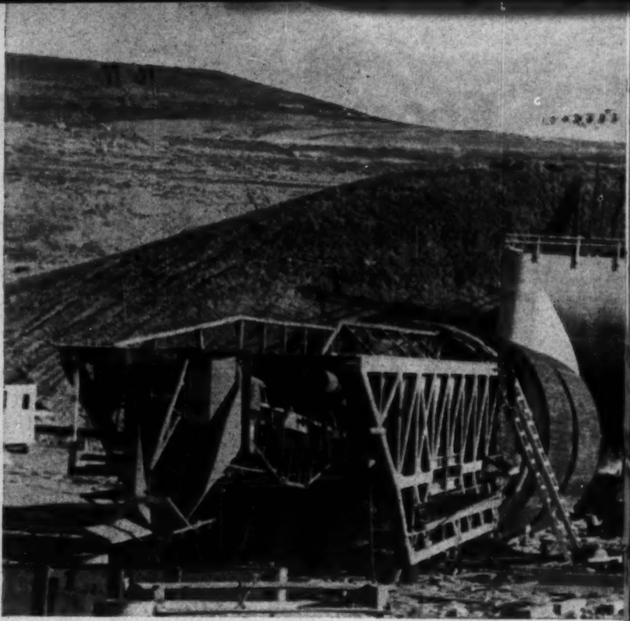




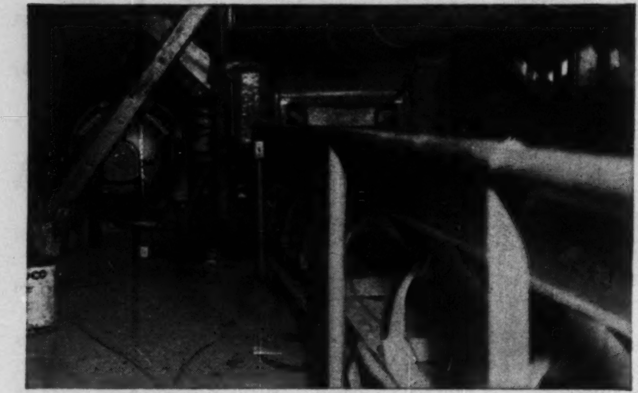
Source: Indexes are joint product of Gov't Board of Building and the construction industry



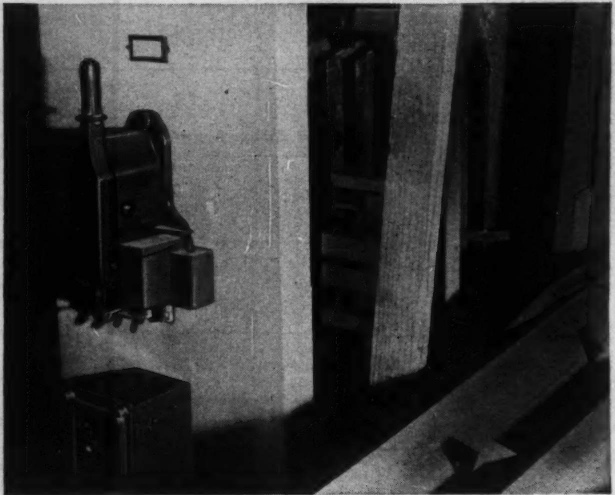
MECHANICAL MARVEL shows its mighty teeth. The 26-foot cutting face can be raised, lowered, and swung from side to side to alter direction of cut. Note concentric cutter heads and shale scoops.



IMMENSITY OF JOB is suggested by view of six tunnel entrances bored in record time by new mole (above). Reinforced concrete tunnels average 1830 feet long.

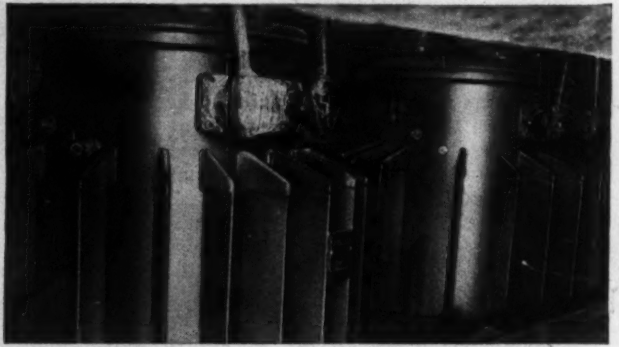


DIGGER'S RELIABILITY depends largely on performance of two 200-hp G-E wound-rotor motors driving cutters through gear mechanisms. Conveyor carries rubble to cars at rear of mole.



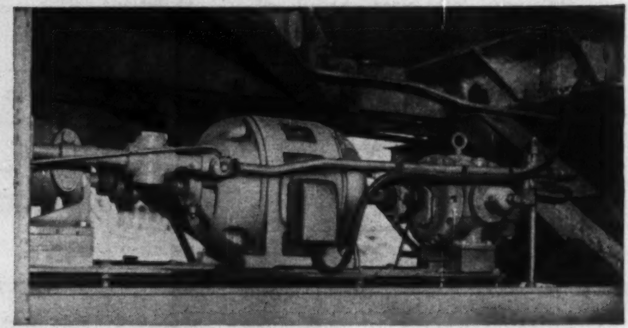
PROTECTION of electrical system is provided by dead-front panel with circuit breaker and ground relay. Compact General Electric equipment had to fit into tight space available.

GENERAL ELECTRIC

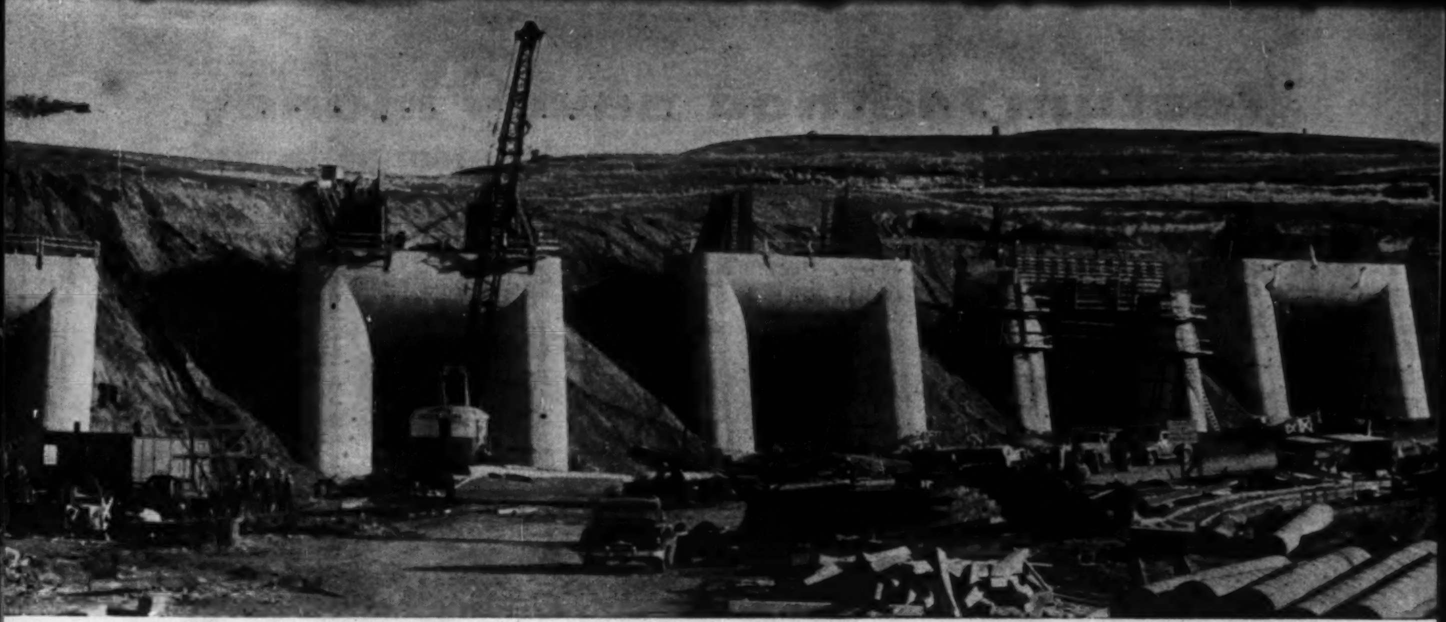


THREE COMPACT 167-kva G-E transformers in digger step down power supplied by cable from diesel-generator outside.

G-E MOTOR CONTROLLERS provide short circuit protection and permit centralized push-button control at operator's station.



EXACT FORWARD MOVEMENT into rock face is accomplished with highly dependable G-E 25-hp motor furnishing power for hydraulically operated "feet" which propel mole on tracks.



Electrically powered by General Electric . . .

New giant "mole" chews tunnels 26′ wide over 4 times faster than previous methods

Mittry Constructors' tunnel digger illustrates high productivity possible with electrified tools

At the Oahe Dam of the Missouri River development near Pierre, S. D., an electrified tunnel digger 90 feet long has slashed tunneling time, costs and dangers. This imaginative use of electricity is even more successful than anticipated by its pioneering designers. James S. Robbins and Associates, Chicago, designed and built the "mole" for Mittry Constructors of Los Angeles under license from Goodman Mfg. Co., Chicago. According to Robbins, help from J. R. Porter, G-E engineer, greatly contributed to completing the digger two months ahead of schedule.

Problem was extremely difficult: How to dig six tunnels each over one-third mile long without exposing shale more than 30 days? Longer exposure would dry and dangerously weaken shale.

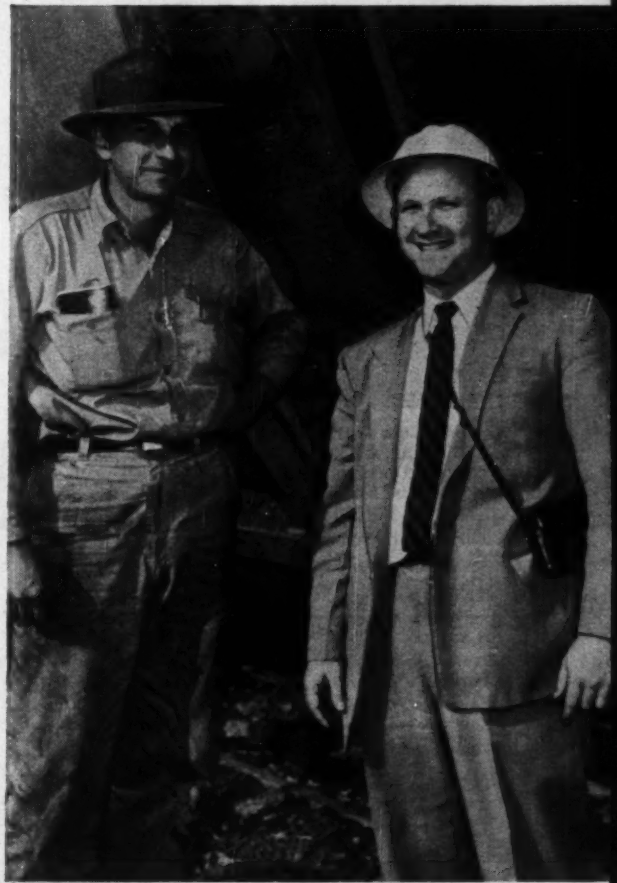
Solution was new electrified tool, which dramatically cut tunneling time to less than one fourth that needed by other methods. Digger was designed with two motor-driven concentric revolving cutter heads with large shale scoops on outside ring. Sections revolve in opposite directions to equalize cutting torque. Scoops dump shale through hopper to conveyor belt. Every four feet, a large I-beam is rammed into shale walls for support. Concrete is then pumped into forms to finish walls.

Down time has been practically zero. Despite conditions such as a constant humidity of 95% in the tunnels, G-E equipment has reliably powered this giant mole continuously and efficiently.

Electrified construction tools can pay off the same way for you too. Let your G-E Apparatus Sales representative show you how G-E equipment, backed by G-E engineering service, can raise tool productivity. Contact your nearest G-E Apparatus Sales office, or write General Electric, Sect. 664-37, Schenectady 5, N.Y.

Engineered Electrical Systems for Heavy Construction Tools

GENERAL ELECTRIC



STANDING BY MOLE'S "FACE" are Bill Mittry of Mittry Constructors and Jim Dillman of G.E., who helped plan the new tunnel giant.

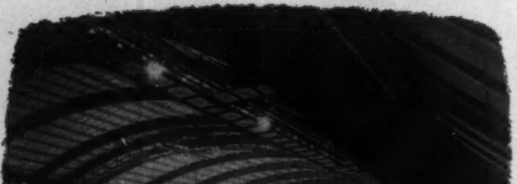
Tectum Method saves money

1 operation takes the place of 3

insulation

structural

sound control



Acoustics are near perfect in the Student Activities Building, University of Maryland, insured by a combined deck and ceiling of 2″ Tectum plank nailed to steel purlins.

Architects: Hall, Border and Donaldson, Baltimore.
Contractor: Baltimore Contractors, Inc.
Erector: Irvin Prickett & Sons, Inc., Washington, D.C.

A single product meets all "overhead" requirements for comfort, safety and economy

Now! The Tectum Method offers you an easy way to cut construction costs *without sacrificing quality or workmanship.* Tectum is more than a product—it's a *method!* In fact, Tectum will actually *improve* the quality of your job. There's a simple explanation for the superiority of Tectum. It does 3 jobs in 1. *First,* it's a roof deck; *second,* it's insulation; and, *third,* Tectum is acoustical. Not only is Tectum time-and-labor-saving, but Tectum's light weight (20 to 24 lbs. per cubic foot) lets you use lighter, more economical spans.

Tectum offers many other merits. Learn about them by writing for a copy of the Booklet "In the Market for a Quality Roof Deck?", or call your local Tectum distributor.

Tectum Division,
Peoples Research and Manufacturing Co.,
500 South 6th Street,
Newark, Ohio

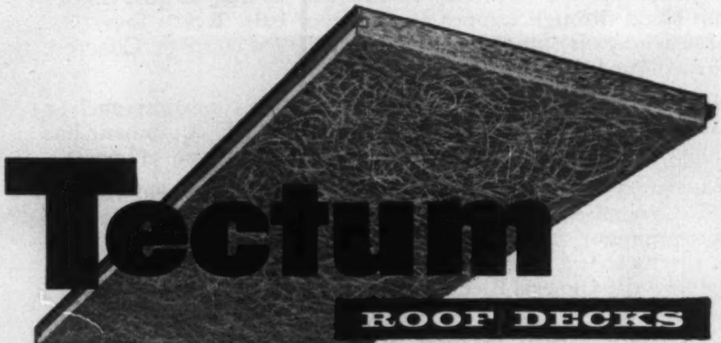
Please send "In the Market for a Quality Roof Deck?"

I am also interested in Tectum for __________

Name __________ *Position* __________

Firm __________

City __________ *Zone* _____ *State* _____



Tectum

ROOF DECKS

FOR PLANTS • COMMERCIAL BUILDINGS • INSTITUTIONS • HOMES

Construction materials prices around the world

Construction materials prices in national currency, fob city

North America and U. S. Territories

City	Structural steel per cwt		Reinf. steel ¾ to 1-in., per cwt		Portland cement per bbl		Lumber, 2x4, S4S, per Mftbm 1st class pine		Lumber, 2x4, S4S, per Mftbm 2nd class pine		Gravel 1½-in., per ton		Sand per ton	
	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Anchorage, Alaska	5.00[a]	4.85[a]	6.55[a]	6.40[a]	7.85[b]	8.05[b]	135.00[cd]	135.00[cd]	125.00[ce]	125.00[ce]	5.00[cfg]	5.00[cfg]	5.00[cfg]	5.00[cfg]
Honolulu, Hawaii	7.00[h]	7.00[h]	6.75[h]	6.75[h]	4.68	4.53	154.00[dp]	145.00[dp]	.....	.....	2.75	2.75	4.00	4.00
Montreal, Canada	8.00[iA]	8.00[iB]	6.65[i]	6.05[i]	2.86	2.96	155.00[d]	110.00[d]	92.00[j]	88.00[j]	2.20	3.00	2.25	2.25
New York, USA	7.48	7.20	6.85[m]	7.01	3.85[o]	3.70	125.00[cm]	113.00[cmG]	127.50[cdn]	120.00[cdnH]	2.85	2.85	1.90	1.90
Ottawa, Canada[i]	9.00[C]	9.00[C]	9.00[C]	8.00	4.84	4.88	240.00	200.00	100.00[e]	80.00[e]	1.50[f]	1.50[f]	1.00[f]	1.50[f]
San Francisco, USA	7.50	7.25	6.85	6.85	3.39	3.70	86.00[er]	64.00[er]	.....	.....	2.07	2.07	2.17	2.17
San Juan, PR[v]	9.00	240.00[s]	6.75	6.00	1.10[t]	1.10[t]	175.00[E]	145.00	125.00[wF]	115.00	3.56[u]	3.50[u]	2.44[u]	1.25[u]
Winnipeg, Canada[i]	9.00	8.70	7.55[x]	7.55[x]	1.17[y]	1.17[y]	95.00[e]	80.00[e]	90.00[e]	75.00[e]	3.75[f]	3.75[f]	3.75[f]	3.75[f]

[a] fob dock, Seattle [b] bulk, fob Anchorage—in paper bags, fob Seattle 6/55, 4.14; 6/54, 4.46 [c] delivered to job [d] Douglas fir [e] spruce [f] per cu yd [g] winter price '55 and '54, 7.00 [h] base price Honolulu, 20 tons and up [i] add dom., prov., & munic. sales taxes [j] spruce [k] base price [m] add 30¢ delivery; '55 price effective Aug 1 new base of Morrisville, Pa [n] truck lots [o] barge lots, and [p] No 1 and No 2, mixed, up to 25% No 2 [r] mill price, add freight [s] per short ton [t] per cwt [u] per, cu meter [v] delivered to site, Santurce [w] local lumber, 2nd cl 2" x 3", 116.75 per Mftbm [x] 1" diam—price for ¾" diam 7.85, 6/55 and 6/54 [y] per 87½ lb bag

Ranges [A] 7.50–8.00 [B] 7.25–8.00 [C] 8.00–9.00 [D] 5.50–6.00 [E] 150.00–175.00 [F] 118.00–125.00

Central and South America

City	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Bogota, Colombia	800.00[a]	680.00[a]	600.00[a]	470.00[a]	80.00[o]	75.00[o]	.....	.....	6.00[c]	6.00[c]	14.00[e]	15.00[e]	13.00[ef]	13.00[ef]
Buenos Aires, Arg.	3,550[a]	3,550[a]	2,300[ab]	2,300[ab]	397[ag]	397[a]	29[hA]	29[hA]	25[i]	25[i]	145[e]	145[e]	40[ej]	40[ej]
Caracas, Venez.	600[ak]	600[akB]	600[ak]	450[ak]	110[ak]	110[ak]	400[l]	.....	370[el]	270[el]	14[e]	14[e]	15[e]	15[e]
Ciudad Trujillo, Dominican R.[m]	8.75	150.00[n]	8.00	7.50[C]	1.45[o]	1.45[o]	120[pD]	120[pD]	.....	.....	2.50[e]	3.16[e]	1.65[e]	1.85[e]
La Paz, Bolivia	.....	.....	260.00[s]	120.00[s]	1,115[t]	483.15[t]	280.00[u]	140.00[u]	200.00[uv]	120.00[uv]	4,000[e]	1,120[e]	4,000[h]	1,120[e]
Lima, Peru	3.80[aH]	3.80[aH]	2.94[s]	2.35[s]	14.45[t]	14.37[t]	4.05[y]	2.90[y]	3.50[yz]	2.80[yz]	34.00[ew]	34.00[ew]	25.00[e]	23.00[e]
Mexico City, Mex.	1,490[a]	1,429[a]	1,490[a]	1,490[a]	185.00[aa]	160.00[aa]	2,000	1,500	1,800	1,300	70.00[bb]	69.00[bb]	......	......
Montevideo, Uru.	.....	.....	480.00[aF]	460.00[aG]	70.00[a]	68.00[a]	600.00[cc]	600.00[cc]	500.00[dd]	470.00[dd]	10.00[a]	9.00[a]	2.70[a]	2.50[a]
Santiago, Chile	88,130[a]	54,770[a]	46,090[a]	24,730[a]	7,239[a]	4,093[a]	300,000[hh]	200,000[hh]	400,000[eehh]	230,000[eehh]	700[em]	470[em]	700[em]	470[em]
Sao Paulo, Brazil	18,000	7,000[ff]	780[ax]	960[ax]	98.50[gg]	73.10[gg]	500[ii]	560[ii]	2,300[de]	1,900[de]	210[h]	215[e]	140[e]	140[e]

[a] per metric ton [b] round iron [c] Local Oak, 20 x 20 cm, per meter [d] beams of peroba, 6 x 12 cm, 5 meters long [e] per cu meter [f] washed, rough—washed, fine 6/55 12.00; 6/54, 11.00—rock sand 6/55, 7.00; 6/54, 4.70 [g] 12/54 [h] 3" x 4" spruce, per sq meter 1" thick [i] 1" x 6" spruce, per sq meter 1" thick [j] fine sand—coarse sand 6/54 and 6/55, 111 [k] fob mill [l] saqui-saqui [m] delivered [n] per short ton [o] per 42.5 kg sack [p] long leaf pine [q] erected [r] fob whse, add 35¢/bbl for delivery [s] per kilogram [t] per 42 kg sack [u] per sq ft [v] price for "madera madra" 6/55, 180.00; 6/54, 80.00 [w] 1-in—2-in 6/55, 32.00; 6/54, 31.00 [x] ⅝-in diam [y] per bd ft [z] price of Tornillo 6/55, 3.40; 6/54, 2.80 per bd ft [aa] Tolteca [bb] blue, per truck load (3½ cu meters) [cc] tea pine [dd] Brazilian pine [ee] poplar (alamo) [ff] local, fabricated ready for erection [gg] national, per 50 kg sack—delivered to job, 102.00 [hh] per 1000 boards, 1" x 10" x 12' [ii] 3" x 3" x 4.27 meters, per doz

Ranges [A] 27–29 [B] 550–600 [C] 7.25–7.50 [D] 110–120 [E] 380–400 [F] 420–480 [G] 380–460 [H] 3.00–3.80

Europe

City	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Amsterdam, Nthlds.	475.85[a]	401.70[a]	487.50[a]	381.00[a]	55.50[a]	55.50[a]	.....	.....	249.00[bc]	229.00[bc]	7.17[a]	7.04[a]	5.02[a]	4.65[a]
Athens, Greece[d]	12[e]	8[e]	9[e]	7[e]	600[a]	500[a]	3,100[c]	2,500[c]	2,800[chh]	2,200[chh]	32[c]	28[c]	40[c]	36[c]
Bonn, W. Germany	431.00[a]	410.50[a]	441.25[a]	420.20[a]	73.00[a]	75.00[a]	245.00[c]	200.00[c]	225.00[c]	185.00[c]	6.00[c]	5.00[c]	7.00[c]	7.00[c]
Brussels, Belgium	4,850[af]	4,170[af]	5,175[af]	4,325[af]	659[ag]	659[ag]	37.50[chi]	36.00[chi]	32.00[chj]	30.00[chj]	87.50[ak]	85.00[ak]	32.50[al]	32.00[al]
Copenhagen, Den.	830.00[am]	625.00[am]	850.00[am]	625.00[am]	19.85[mn]	18.80[mn]	13.59[mo]	11.98[mo]	13.09[mo]	10.80[mo]	16.50[clg]	16.50[clg]	7.75[clr]	7.75[clr]
Geneva, Switzerland	52.00[amt]	52.00[amt]	60.00[amt]	52.50[amt]	5.40[mu]	5.40[mu]	250.00[mc]	200.00[cm]	.....	.....	9.00[s]	9.10[s]	11.50[sA]	9.10[s]
Helsinki, Finland	50[aw]	63[aB]	48[aw]	54[aC]	403[n]	403[n]	.....	.....	42,000[xD]	42,000[xD]	820[c]	820[c]	700[c]	700[c]
London, England	30/5/-[yqw]	30/5/-[yqw]	31/13/-[yrw]	32/1/-[yrw]	5/-/-[yz]	5/-/-[yz]	130[aaE]	125[aaF]	105[aaG]	100[aaH]	-21/-[bb]	-/18/-[bb]	-/22/3[bb]	-/20/6[bb]
Madrid, Spain[dd]	4,775[apeeI]	7,500[apJ]	5,214[apff]	3,200[apee]	456.89[ap]	416[ap]	2,800[cp]	2,800[cpK]	2,540[cp]	1,500[cpL]	38.00[cl]	40.00[clM]	24.00[cl]	17.00[clN]
Oslo, Norway	45.00[iijj]	40.10[iijj]	45.00[iipp]	40.00[iipp]	115.00[a]	115.00[a]	1,340[nngg]	1,170[nn]	1,270[nn]	1,100[nn]	16.00[bbT]	16.00[bbT]	11.50[bbU]	11.50[bbU]
Paris, France[m]	67,012[a]	68,380[a]	70,589[akk]	72,030[akk]	7,788[a]	7,711[a]	32,500[cll]	30,265[cll]	22,900[cll]	21,642[cll]	2,221[amm]	2,221[amm]	1,975[acc]	1,975[acc]
Rome, Italy	83[ep]	82[ep]	7,600[pe]	7,400[pe]	1,060[mu]	1,060[mu]	35,500[cm]	36,000[cm]	34,000[cm]	33,500[cm]	1,900[cmnn]	1,600[cmnn]	980[cm]	870[cm]
Vienna, Austria[m]	375.00[aO]	375.00[aO]	350.00[a]	350.00[a]	447.50[a]	447.50[a]	.....	.....	1,000[c]	800.00[c]	36.00[c]	36.00[c]	40.00[c]	40.00[c]
Stockholm, Sweden[m]	675[a]	595[a]	657.50[a]	560.00[a]	89.50[a]	90.60[a]	2.34[oo]	2.27[oo]	1.29[oo]	1.29[oo]	11.75[cP]	11.00[cQ]	10.75[cR]	10.00[cS]

[a] per metric ton [b] 1½" x 4" local equivalent [c] per cu meter [d] prices are in thousands of drachmae [e] per kilogram [f] add freight from basing pt [g] by barge [h] 2½" x 7" per running meter [i] Scandinavian [j] domestic [k] crushed, 8/20-in, fob barge on Meuse [l] fob quarry [m] delivered [n] per 4 bags = 170 kg [o] per cu ft [p] fob mill [q] whse price 6/55, 45/15/–; 6/54, 40/–/– [r] whse price 6/55, 44/3/–; 6/54, 40/–/– [s] per 100 kgs [t] carlots [u] per 50 kg bag [v] add 4.50 for delivery [w] approx [x] 6th cl pine timbers, untrimmed, per 4.672 cu meter equiv [y] per long ton [z] paper bags, delivered, 6 ton loads [aa] per 165 cu ft [bb] per cu yd [cc] coarse—fine 2,025 [dd] incl 7.4% tax [ee] black market 7.500 [ff] black market 50% more [gg] 2/3 sharp edges [hh] local equivalent 6/55, 2,500; 6/54, 2,000 [ii] per cwt over 10 metric tons, add extras—6/55 13 and 10mm, 1.35; 6mm, 3.80; 6/54 13mm, 0.50; 10mm, 0.75; 6mm, 2.00 [jj] whse price; mill price 6/55, 42.00; 6/54, 33.00 [kk] 2/5" diam [ll] 1" x 3 1/5", Vosges [mm] 1-in [nn] 2–3 cm—5 cm 6/55, 1,700; 6/54, 1,500 [oo] per lineal meter [pp] whse price, round soft steel—mill price 6/55, 37.00; 6/54, 32.00

Ranges [A] 9.50–11.50 [B] 58–63 [C] 52–54 [D] 40–42,000 [E] 110–130 [F] 105–125 [G] 95–105 [H] 90–100 [I] 3,070–4,775 [J] 7,200–7,500 [K] 1,820–2,800 [L] 900–1,500 [M] 35–40.00 [N] 14.00–17.00 [O] 350.00–375.00 [P] 10.75–11.75 [Q] 10.00–11.00 [R] 9.75–10.75 [S] 9.00–10.00 [T] 11.10–16.00 [U] 6.70–11.50

Africa and Middle East

City	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Cairo, Egypt[o]	5,000[a]	4,200[a]	4,800[a]	4,000[a]	520[a]	520[a]	3,300	2,900	2,800	2,600	70[f]	60[f]	35[f]	30[f]
Casablanca, Morocco	55,050[a]	55,050[a]	49,750[ac]	49,750[ac]	6,415[ad]	7,000[ad]	27,270[ef]	27,270[ef]	25,250[fg]	25,250[fg]	700[fh]	750[fh]	220[fh]	230[fh]
Johannesburg, So. Af.	34/-/-[ij]	34/-/-[ij]	30/-/-[ik]	30/-/-[ik]	-/5/½[l]	-/4/10½[l]	-/4/-[bm]	-/4/-[bm]	-/2/5[bn]	-/2/5[bn]	-/14/-[p]	-/14/-[pA]	-/16/-[pq]	-/16/-[pq]
Beirut, Lebanon	0.45[rB]	0.60[rG]	0.39[rC]	0.35[rH]	63.50[a]	64.50[a]	235.00[fs]	225.00[fs]	190.00[ft]	155.00[ft]	7.00[f]	6.50[f]	4.00[f]	3.50[f]
Istanbul, Turkey	1,000[a]	750[a]	1,500[aD]	650[a]	100[auE]	80[auF]	360[fv]	315[fv]	280[fv]	235[fv]	22[fwI]	15[fwJ]	20[fwK]	12[fwL]
Tel Aviv, Israel	420[ae]	405[ae]	360[ae]	350[ae]	62.750[a]	58.750[a]	350[f]	240[f]	250[fx]	220[fx]	3.400[f]	3.240[f]	1.700[f]	1.40[f]

[a] per metric ton [b] 9" x 3" per running foot [c] 12mm diam [d] bulk, fob mill [e] imported [f] per cu meter [g] imported—local cedar 6/55, 19,000; 6/54, 18,000 [h] fob quarry [i] per short ton [j] imported 6/55, 40/-/-; 6/54, 37/-/- [k] imported 6/55, 34/-/-; 6/54, 32/-/+ [l] per 94 lb bag [m] clear Oregon [n] Oregon [o] prices in piasters [p] per cu yd [q] river sand for concrete—pit sand for mortar -/13/- [r] per kilogram [s] Swedish fir [t] Whitewood [u] fob plant [v] fob yard [w] delivered [x] European spruce 6/55, 185.00; 6/54, 164.00

Ranges [A] -/10/- to -/14/- [B] 0.40–0.45 [C] 0.30–0.39 [D] 1,000–1,500 [E] 75–100 [F] 60–80 [G] 0.35–0.60 [H] 0.32–0.35 [I] 15–22 [J] 12–15 [K] 15–20 [L] 10–12

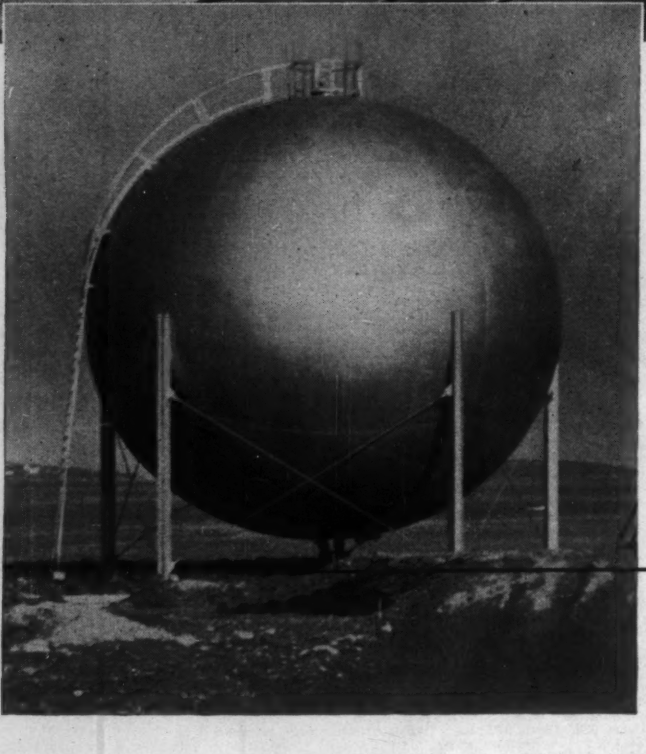
Asia and Australia

City	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Bombay, India	500/-/-[a]	500/-/-[a]	550/-/-[a]	480/-/-[a]	105/-/-[a]	105/-/-[a]	15/-/-[bc]	12/-/-[bc]	10/-/-[bc]	9/-/-[bc]	40/-/-[de]	40/-/-[de]	36/-/-[e]	40/-/-[e]
Colombo, Ceylon	750.00[a]	750.00[a]	700.00[a]	700.00[a]	180.00[avA]	180.00[aA]	24.00[cfB]	24.00[cfB]	14.00[cg]	14.00[cg]	16.00[u]	16.00[u]	5.00[u]	5.00[u]
Karachi, Pakistan	615/-/-[a]	615/-/-[a]	765/-/-[a]	600/-/-[a]	76/-/-[a]	82/-/-[a]	7/8/-[c]	7/8/-[c]	6/12/-[ch]	6/12/-[ch]	80/-/-[ij]	80/-/-[ij]	80/-/-[j]	80/-/-[j]
Tokyo, Japan	40,000[k]	50,000[k]	35,000[k]	30,000[k]	8,000[k]	8,700[k]	4,000[l]	4,000[l]	3,500[l]	3,500[l]	6,700[m]	8,200[m]	4,700[m]	5,500[m]
Manila, PI	700[kC]	800[kD]	500[kE]	480[kF]	3.80[n]	3.80[no]	.....	.....	190[fG]	200[fH]	5.50[pI]	6.00[pJ]	5.00[pK]	5.00[pK]
Melbourne, Aust.	45/-/-[aq]	43/-/-[aq]	40/-/-[ar]	38/-/-[ar]	10/8/9[as]	10/8/6[as]	17/-/-[tL]	14/10/-[tM]	8/12/6[tN]	5/12/6[tO]	1/12/6[u]	1/9/10[u]	1/12/-[u]	1/8/6[u]
Wellington, NZ	3/-/3	3/-/-	3/1/-[w]	2/12/-[wP]	11/18/1[e]	13/-/-[aQ]	.....	.....	3/17/-[x]	3/15/3[x]	1/13/4[u]	1/4/-[u]	2/-/4[u]	1/15/-[u]

[a] per long ton [b] Indian teak [c] per cu ft [d] broken stone [e] per 100 cu ft [f] Red Lauan [g] local equivalent [h] Deodar 6/4/- [i] hardwood [j] per 125 cu ft; [k] per metric ton [l] per koku, 1' x 1' x 10' [m] per ryutsubo, 6' x 6' x 6' [n] per 94-lb bag [o] black market 6.50 [p] per cu meter [q] imported 6/55, 68/-/- to 72/-/- 6/54, 51/10/- to 62/15/- [r] imported 6/55, 57/10/- to 63/-/-; 6/54, 49/-/- to 55/-/- [s] imported 6/55, 15/-/- to 16/12/6; 6/54, 14/10/6 to 17/3/- [t] kiln dried, per 100 board ft [u] per cu yd [v] price varies with local shortages, arrivals, currently Rs 180.00 [w] 7/8" rounds [x] Pinus or Rimu, per 100 board feet

Ranges [A] 130.00–180.00 [B] 20/- to 24/- [C] 500–700 [D] 650–800 [E] 330–500 [F] 370–480 [G] 170–190 [H] 180–200 [I] 4.10–5.50 [J] 5.00–6.00 [K] 4.50–5.00 [L] 13/17/6 to 17/-/- [M] 11/-/- to 14/10/- [N] 7/19/- to 8/12/6 [O] 5/4/- to 5/12/6 [P] 2/10/- to 2/12/- [Q] 9/2/- to 13/-/-

For digester gas storage



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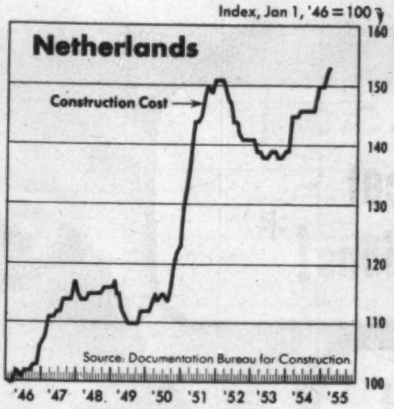
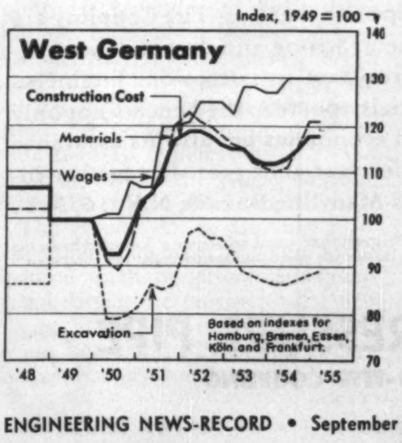
Construction wages around the world



- **Amsterdam, Netherlands,** wage rates shown in the table are tariff-work rates. They are based on average piece-rates paid on new construction and include social charges. The building cost index shown in the chart is a weighted aggregate of the man-hours cost and materials cost for four one-family houses and four apartment blocks. Man-hours are based on 1938-39 and adjusted for changes in productivity. Productivity from January, 1946 to March, 1949 was estimated at 70% of the 1938-39 average and from April, 1949 on at 80% of the 1938-39 average.
- **Athens, Greece** has an abundant supply of construction materials. Both skilled and unskilled labor are plentiful.
- **Bonn, Germany** expects shortages of construction materials despite increased output. The construction industry believes shortages of materials and labor can be avoided only by extending the construction season through the winter months and hopes the government will place orders for winter delivery to help prevent supply bottlenecks. This year both unskilled and skilled labor are scarce but labor unions have balked at permitting an influx of Italian labor during the summer months because of the effects of the low wages. The indexes in the chart below are supplied by the Ministry for Housing Construction.



Rates per hour in national currency June 1954 and June 1955

North America and U. S. Territories

City and Country	Exch. rate June '54 per $1 US	Common Labor Heavy constr. 6/55	Common Labor Heavy constr. 6/54	Common Labor Building 6/55	Common Labor Building 6/54	Bricklayers 6/55	Bricklayers 6/54	Carpenters 6/55	Carpenters 6/54	Structural Ironworkers 6/55	Structural Ironworkers 6/54
Anchorage, Alaska..[a]	$1.00	$3.285[h]	$3.22	$3.25[h]	$3.185	$4.39[h]	$4.32	$3.69[h]	$3.565	$4.035[h]	$3.965
Honolulu, Hawaii..[a]	1.00	1.46	1.46	1.46	1.46	2.40	2.40	2.10	2.10	2.50	2.50
Montreal, Canada.[a b]	0.98⅜	1.25[c]	1.25[d]	1.25[c]	1.25[d]	2.00[c]	2.00[d]	1.80[c]	1.80[d]	1.90[c]	1.90[d]
New York, USA....[a]	1.00	2.415[e]	2.415[e]	2.415[e]	2.415[e]	4.15[f]	4.15[f]	3.57[f]	3.57[f]	3.975[e]	3.975[e]
Ottawa, Canada....[a]	0.98⅜	1.00	1.10	1.00	1.10	2.10	2.00	1.82	1.75	2.05	2.00
San Francisco, USA[a]	1.00	2.275[e]	2.125[e]	2.275[e]	2.125[e]	3.65[f]	3.475[f]	3.005[e]	2.905[e]	3.175[e]	3.075[e]
San Juan, PR.....[a]	1.00	0.75	0.65	0.50[g]	0.35[g]	1.00	1.00[A]	0.90	0.90[B]	1.00	1.00[A]
Winnipeg, Canada...	0.98⅜	....	1.25	....	1.05	....	2.10	....	1.90	....	1.95

[a] 8-hr day, [b] negotiating [c] plus 8% fringe benefits [d] plus 2% vac pay [e] incl fringe benefits [f] 7-hr day [g] min rate; actual rate over 50¢/hr [h] plus 3¢ Aug. 1 Ranges [A] up to $1.00 [B] 0.85–0.90

Central and South America

City	per $1 US	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Bogota, Colombia..[a b]	2.50 Pesos	0.90	0.90	0.71	0.71	0.71	0.71	1.00	0.90	1.80[A]	1.26
Buenos Aires, Arg[a c d e]	14.00 Pesos	41.00	41.00	41.00	41.00	51.00	51.00	51.00	51.00	....	....
Caracas, Venez...[a e f]	3.35 Bs.	14.00	11.85	11.70	11.70	25.70[B]	25.70[B]	25.70[C]	25.70[C]	25.70[B]	25.70[B]
Ciudad Trujillo, Dominican R....[a]	RD $1.00	1.50[c]	1.50[c]	1.50[c]	1.50[c]	4.50[c o]	4.50[c o]	4.50[c o D]	4.50[c o D]	..[h]..	6.00[c E]
La Paz, Bolivia....[a i]	Bs. 2,700*	445	200	186	82	233	115	350	152	371	162
Lima, Peru.......[a j]	19.00 Soles†	28.30	28.03	24.14	23.90	40.37	39.98	40.37	39.98	45.90	45.45
Mexico City, Mex..[a]	12.50 Pesos	1.19[m]	1.00[m]	1.19[m]	1.10[m]	2.25	2.48	2.25	2.48	1.37[n]	1.24[n]
Montevideo, Uru..[a k]	3.33 Pesos**	1.40[m]	1.08[m]	1.36[m]	1.04[m]	1.70	1.50	1.70	1.50	....	....
Santiago, Chile....[a l]	200 Pesos***	60.40	39.50	57.00	36.00	91.20	56.20	85.20	52.40	85.20	52.40
Sao Paulo, Brazil...[a]	CR $80.00♯	11.00	9.00	9.60	7.00	15.00	15.00[F]	18.00	15.00[F]	18.00	16.00[G]

[a] 8-hr day [b] incl 44% soc ins, etc. [c] per day [d] 44-hr week [e] plus 80% for ins & other soc chgs [f] incl 7th day pay & 15 days/yr vac [g] master paid $30–$50 per mo [h] 1.00 per cwt handled [i] incl soc chgs [j] incl soc ins, unemploy tax, comp ins, vac & other taxes [k] plus soc chgs 33.01% [l] incl soc chgs—6/55, 52%; 6/54, 51% [m] peons [n] remachadores, aver per hr [o] master mason earns 5.00–8.00/day Ranges [A] 1.00–1.80 [B] 23.30–25.70 [C] 21.00–25.70 [D] 3.50–4.50 [E] 5.00–6.00 [F] 13.00–15.00 [G] 14.00–16.00 * 6/54: Bs. 1,420 per $1 US ** 6/54: $3.16 per $1 US *** 6/54: 110 pesos per $1 US ♯ 6/54: Cr. $20.00 per $1 US † 6/54: 19.90 Soles per $1 US

Europe

City	per $1 US	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Amsterdam, Nthlds.[c]	3.80 Fl.	....	....	....	....	2.133	2.018	2.153[d]	2.038[d]	2.062	1.905
Athens, Greece....[q r]	30,000 Drch.	80[A]	68[B]	65[C]	58[D]	130[E]	120[F]	150[G]	120[F]	130[E]	120[F]
Bonn, W. Germany.[a]	4.20 DM	2.01	1.90	1.81	1.71	2.12	2.00	2.12	2.00	2.12	2.00
Copenhagen, Den..[e]	6.92 Kr.	5.38[e]	....	5.38[e]	....	6.80[f]	6.49[g]	6.42[f]	5.81[g]	....	....
Geneva, Switz.....[a]	4.28 Sw fr.	2.53	2.47	2.53	2.47	3.05	2.95	3.17	3.07	3.08	2.95
Helsinki, Finland...[h]	231 markkaa	143	130	127	115	263[H]	250[I]	263[H]	250[I]	263[H]	250[I]
London, England...[a]	£-/7/-	-/3/7[t]	-/3/5	-/3/7[t]	-/3/5[u]	-/4/1½[t]	-/3/10½[u]	-/4/1½[t]	-/3/10[u]	-/3/11[s t]	-/3/8[p u]
Madrid, Spain.....[a i]	38.95 Pts.	3.79	3.72	3.79	3.72	4.90	4.80	4.74	4.65	4.90	4.80
Oslo, Norway......[j]	7.14 N. kr.	6.71	6.42	5.08	5.06	6.21	5.92	5.38	4.99	....	....
Paris, France.....[a k]	350 Fr	179	163	179	163	191	181[M]	195	185[N]	213	213[O]
Rome, Italy.......[a l]	624.80 Lire	282.22	265.38	282.22	265.38	316.00	296.40	347.33	325.72	347.33	325.72
Vienna, Austria...[a m]	26.00 Sch	6.20	6.20	6.20	6.20	7.15[n]	7.15[n]	7.45[o]	7.45[o]	6.80	6.80
Stockholm, Sweden.[b]	5.18 Kr.	6.00[J]	6.00[J]	6.00[J]	6.00[J]	8.00	8.00[L]	8.00	7.50[K]	6.00	6.00

[a] 8-hr day [b] per day [c] incl soc chgs, based on "tariff-works" (piecework) rates [d] incl 0.02 f per hr tool allow [e] 6-day wk [f] 3Q 1954 [g] 3Q 1953 [h] 46½ hr wk except Jul-Aug, 45 hrs; skilled pd on pcwk [i] add 95% soc ins [j] 48-hr wk, based on piecework [k] incl soc chgs: 41.74% (except 44.19% for carpenters) [l] incl soc chgs [m] 4 days of 9½ hr, 1 day of 10-hr [n] igcl 0.10 tool allow [o] incl 0.25 tool allow [p] 8½-hr day, plus 5½ hrs Sat [q] thous drachmae [r] 46½-hr week except May-Sept 45 hrs [s] approx [t] add 12½% soc chgs [u] add 11½% soc chgs Ranges [A] 65–80,000 [B] 58–68,000 [C] 58–65,000 [D] 48–58,000 [E] 120–130,000 [F] 110–120,000 [G] 120–150,000 [H] 210–263 [I] 200–250 [J] 5.00–6.00 [K] 6.50–7.50 [L] 7.00–8.00 [M] 181–201 [N] 185–205 [O] 201–213

Africa and the Middle East

City	per $1 US	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Cairo, Egypt......[a b c]	34.643 Pi	40[A]	40[A]	30[B]	30[B]	100	100	100	100	80[D]	80[D]
Casablanca, Mor...[a]	3.50 Fr	75[c E]	73[c F]	75[c E]	73[c F]	165[C]	155[C]	144[C]	134[C]	165[C]	155[C]
Johannesburg, So. Af...........[h]	£-/7/2¼	-/1/5¼[d e]	-/1/5½[d e]	-/1/5¾[d f]	-/1/5½[d f]	-/7/9½[e g]	-/7/9½[e g]	-/7/9½[e g]	-/7/9½[e g]	....	....
Beirut, Lebanon....[a]	£3.22	0.95[G]	0.80[H]	0.75[I]	0.65[J]	1.25[K]	1.50[L]	1.85[M]	1.50[N]	1.50[L]	1.25[K]
Istanbul, Turkey....[i]	2.825 Lires	1.00[O]	0.85[P]	0.80[Q]	0.75[R]	1.50[N]	1.25[K]	2.00[S]	2.00[S]	2.20[T]	2.00[S]
Tel Aviv, Israel....[a b]	£0.556	....	....	7.460[j]	7.060	8.480	7.980	8.480[j]	7.980[j]	....	....

[a] 8-hr day [b] per day [c] 10-hr/day max 50-hr wk to allow for time lost because of weather [d] add housng levy, 0.06d per hr [e] 9 1/5-hr day [f] 8 1/5-hr day [g] incl hol fund, benefit fund & comp [h] min rates; actual higher due to shortage [i] 10-hr day [j] organized labor rates Ranges [A] 30–40 [B] 25–30 [C] 80–100 [D] 60–80 [E] 57–75 [F] 52–73 [G] 0.80–0.95 [H] 0.70–0.80 [I] 0.65–0.75 [J] 0.60–0.65 [K] 1.00–1.25 [L] 1.25–1.50 [M] 1.25–1.85 [N] 1.00–1.50 [O] 0.75–1.00 [P] 0.60–0.85 [Q] 0.65–0.80 [R] 0.60–0.75 [S] 1.50–2.00 [T] 1.80–2.20

Asia and Australia

City	per $1 US	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Bombay, India....[a b]	Rs 4/12/-*	-/8/-	-/8/-	-/6/-	-/6/-	-/12/-	-/12/-	-/12/-	-/12/-	1/4/-	1/4/-
Colombo, Ceylon...[a c]	Rs 4.74	0.32[g]	0.32	0.32[g]	0.32	0.41[g]	0.41	0.41[g]	0.41	0.41[g]	0.41
Karachi, Pakistan..[a]	Rs 3.335	-/6/-	-/6/-	-/4/9	-/4/6	-/13/-	-/12/-	-/13/-	-/12/-	-/12/-	-/11/-
Tokyo, Japan......[a]	360 Yen	66.00	66.00	54.00	54.00	84.00	84.00	77.50	75.00	81.00	81.00
Manila, PI.........[a]	2.34 Pesos	0.50	0.50	0.50	0.50	1.25[A]	1.00[B]	1.25[C]	1.00[B]	1.25[A]	1.00[B]
Melbourne, Aust..[a d e]	£-/9/-	21/17/3[F]	18/12/2[G]	21/17/3[F]	18/12/2[G]	22/15/-	21/3/3	21/18/2	20/8/5	....	....
Wellington, NZ...[a d f]	£NZ-/7/1	10/13/4	10/3/6	10/15/8	10/9/11	11/19/8	11/13/5	11/12/8	11/6/8	11/10/9	11/4/7

[a] 8-hr day [b] per day [c] minimum rates; larger firms pay more and provide mid-day meal worth 23 cents [d] per 40-hr week [e] incl paid holidays, statutory and unofficial additions—base rates, 6/55: common labor on heavy construction, 14/14/2; common labor on buildings, 14/4/2; bricklayers, 17/8/4; carpenters, 17/7/6; str ironworkers, 12/2/- to 18/19/3 [f] minimum rates; many employers offer more [g] now negotiating for 3 cents/hr increase Ranges [A] 0.75–1.25 [B] 0.75–1.00 [C] 0.625–1.25 [D] 18/-/2 to 21/17/3 [E] 18/-/2 to 18/12/2 [F] 18/-/2 to 21/17/3 [G] 18/-/2 to 18/12/2 * 6/54 rate: Rs. 4/12/6 per $1 US

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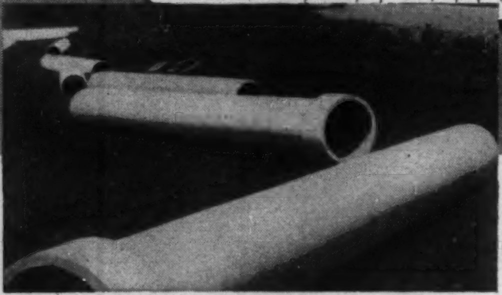
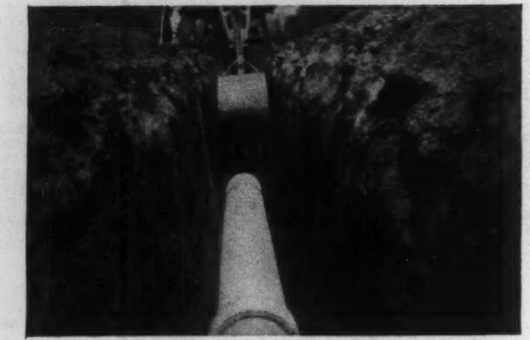
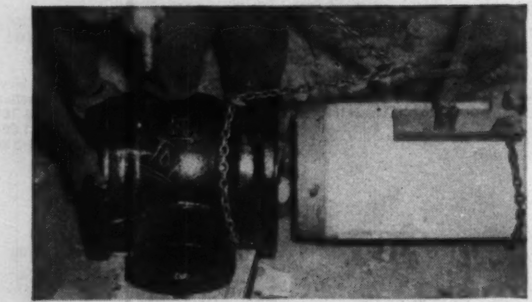
Installation time cut beyond all expectations!*
You can be sure that he did it with Transite® Pressure Pipe and the NEW Ring-Tite® Coupling



Easy handling, fast assembly



Installation follows digger closely



Ring-Tite Fittings, too—You can join pipe directly to fittings, valves and hydrants embodying the Ring-Tite design . . . no special tools needed, no poured joints

You, too, can complete your water-line jobs ahead of schedule and at lower installed cost. Transite Pressure Pipe with the new Ring-Tite Coupling gives you easier handling, simplified and speedier assembly, protects your job with a positive joint seal. Installation can go forward under adverse terrain and weather conditions.

With the Ring-Tite Coupling, installation costs are less—assembly follows the digger closely. The special coupling design permits quick, easy alignment. To assemble, rubber rings are simply popped into grooves. Then lubricated pipe-ends slide in under the rings easily, smoothly, and surely.

Pipe-ends stop positively and are positioned accurately—with ends automatically separated within the coupling. This gives the line flexibility to withstand shock and vibration, relieves line stresses, permits conformance to curves.

Transite Pressure Pipe and the Ring-Tite Coupling are made of asbestos-cement. Strong and durable, they cannot rust; are highly resistant to corrosion. Engineers and water works officials, too, reap the benefits not only of Transite's installed economies but also its assurance of operating economies year after year. For further information write Johns-Manville, Box 60, N.Y. 16, N.Y.

*Excerpt from actual field report: "Exceeded by far the installation speed anticipated under job conditions."

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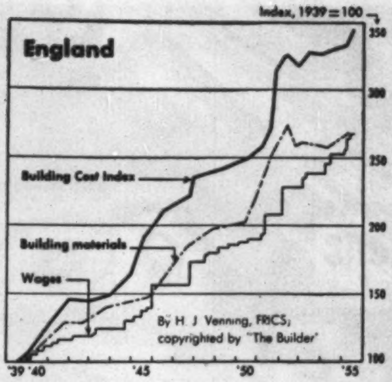
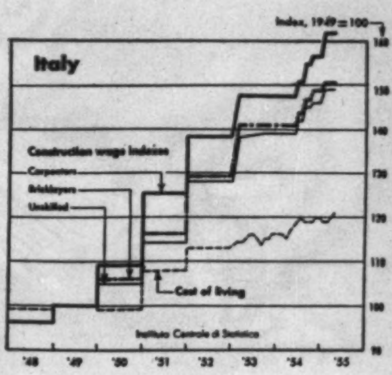
Johns-Manville TRANSITE PRESSURE PIPE

WITH NEW RING-TITE COUPLING



By H. J. Venning, FRICS; copyrighted by "The Builder"



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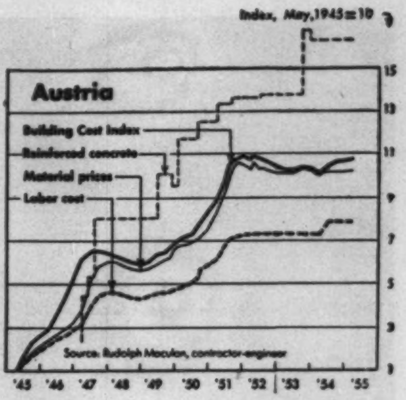


Source: Rudolph Maculan, contractor-engineer

Construction Costs Around the World

• **Geneva, Switzerland** lumber prices are up 20-25% over a year ago. Materials are in good supply but building workers have always been in short supply. Large numbers of skilled and unskilled Italian workers come in for three to nine months of each year and are paid the same wages and get the same benefits as Swiss workers.

• **Helsinki, Finland** has a comparatively good supply of construction materials but skilled labor is short. Unskilled labor is plentiful. Building costs have been stable since 1953.

• **London, England** reports reinforcing steel in very tight supply. There are also spotty shortages of brick. Cement supplies are far from easy but production in '55 is expected to increase about 500,000 tons. Skilled labor remains difficult to find this year because of high employment. Construction activity is even with '54.

• **Madrid, Spain** has a steel shortage, though supplies of other construction materials are in good shape. Skilled labor is short, but plenty of unskilled is available. Construction volume is higher than last year because of increased government construction.

• **Oslo, Norway,** reports shortages of materials, skilled and unskilled workers because of the high level of construction.

• **Paris, France** has a good supply of materials but prices remain high. The country is beginning to feel a labor shortage, especially of skilled workers.

• **Rome, Italy** reports cement short in some parts of the country, though output has increased fast in recent years (from 7.8 million tons in 1953 to more than 10 million tons in 1955.) Bricks are insufficient to meet demand. Skilled labor is in short supply.

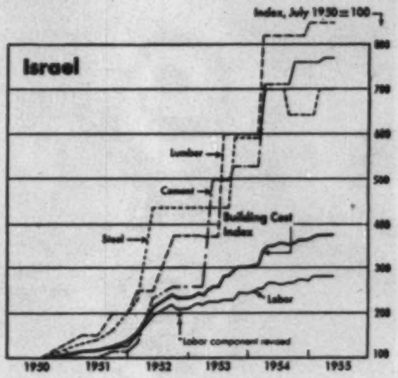
The government is planning a 10-year express highway program to be financed partly by government grants in aid. Under the provisions of a new foreign investments act already passed by one house of the Parliament American contractors could transfer profits and capital out of the country immediately and with no limitations.

• **Vienna, Austria** sources say the rapid expansion of construction volume has created labor bottlenecks and severe materials shortages. Despite record output, cement and steel must be imported to fill the gap. Austria's biggest cement mill is delivering to its customers no more than they purchased in 1954. Construction volume is up about 10% with private construction in a rapid upswing. On June 25 the government decided to slow down the pace of government construction to relieve the severe shortages of labor and building materials. It extended construction completion dates for 1955 far into 1956 and stopped all new starts until October '55 at the earliest.

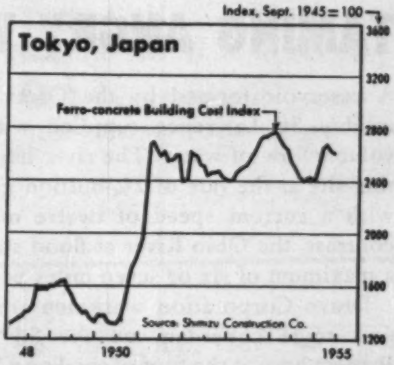
• **Cairo, Egypt** has a plentiful supply of construction materials and while June '55 prices were higher than a year ago, they were below early 1955. Both skilled and unskilled labor are so plentiful that Egypt is exporting construction workers to Saudi Arabia and to Kuwait. Heavy exports have created a cement shortage.

• **Johannesburg, So. Africa** has its usual labor shortage and because of this actual wages paid are substantially higher than the minimums shown in the table. Most materials are in adequate supply but steel is short. Domestic mills supply only 60% of the steel needs while the more costly imported steel is hard to get.

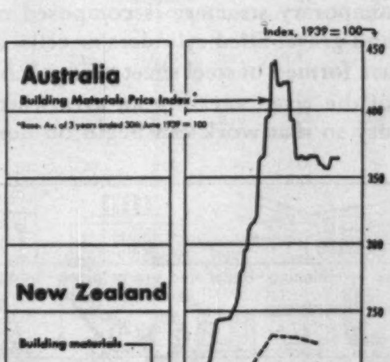
• **Melbourne, Australia** reports spotty materials shortages. Melbourne and the State of Victoria are very short of most key materials but there are few shortages in Sydney and New South Wales. Because mills cannot meet demand and import restrictions are more severe, steel shortages are likely. The country is having another wave of inflation. Prices may go up another 5-10% by the end of '55. Skilled labor is still very short and the supply of unskilled is close to inadequate.



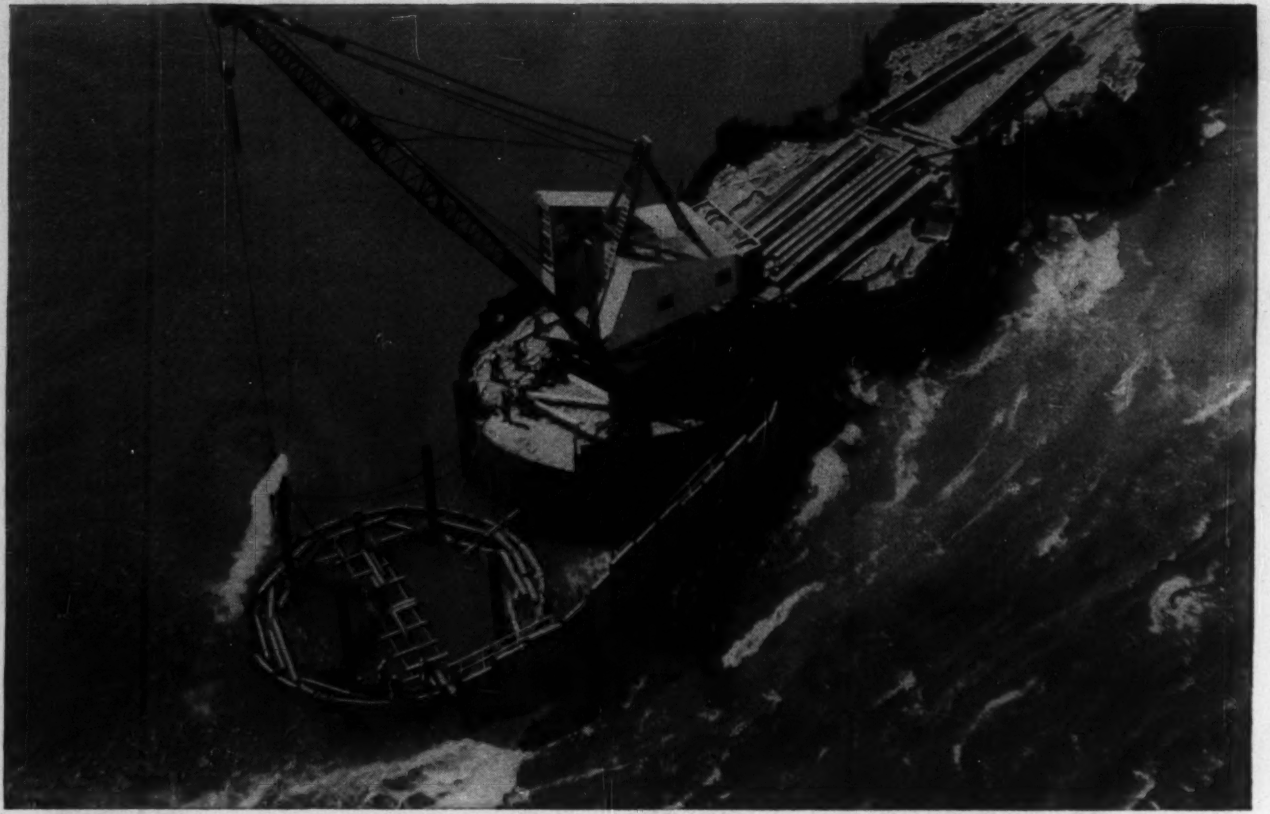
Source: Central Bureau of Statistics and Economic Research



Source: Shimzu Construction Co.



Source: Commonwealth Bureau of Census and Statistics
N.Z. Census & Statistics Dept.



TAMING ANGRY WATERS OF THE ST. LAWRENCE RIVER

A reservoir formed by the Great Lakes keeps the mighty St. Lawrence supplied with a steady high volume flow of water. The river has been raging past this site at the rate of 2¼-million gallons per second with a current speed of twelve miles per hour. In contrast, the Ohio River at flood stage only moves at a maximum of six or seven miles per hour.

Dravo Corporation workmen are constructing the first stage cofferdam on the St. Lawrence Power Project here at the foot of the Long Sault Rapids. This temporary structure is composed of a series of sand and gravel-filled cylinders or cells, the shells of which are formed of steel sheet piling. It blocks off a portion of the river, creating an area which can be pumped dry so that work can begin on Long Sault Dam.

A deflector of concrete and steel, sustaining 150 tons of continuous water pressure, diverts the rapids to permit setting the 47-foot diameter cells. In addition to swift water, Dravo also encountered the highest river flow in 80 years . . . an extremely rainy autumn . . . ice and below-zero temperatures . . . one of the heaviest blizzards on record.

This history-making project is typical of many such undertakings of a difficult or hazardous nature. For more than 60 years Dravo has been serving business and industry in many engineering fields, with customer satisfaction considered essential in every transaction. For more information write DRAVO CORPORATION, PITTSBURGH 25, PENNA.

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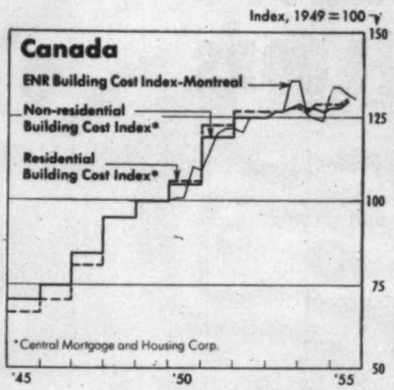


World Cost Trends

- **Istanbul, Turkey** reports materials, most of which are imported from countries behind the Iron Curtain, are in tight supply because foreign exchange is scarce. Cement plants cannot keep up with demand and though 10 mills are under construction even they may not meet domestic needs. Reinforcing steel is scarce and prices are up considerably. Galvanized and black pipe are almost impossible to get. Skilled labor is growing scarce. While unskilled labor is more plentiful than a year ago it costs more.
- **Tel-Aviv, Israel** has a good supply of materials. Unskilled labor is plentiful and the supply of skilled is adequate. Local trade schools are turning out increasing numbers of tradesmen.
- **Bombay, India** prices of reinforcing steel and Indian teak are trending upward. Restrictions on steel supplies will continue until expansion plans are carired out. Labor is plentiful.
- **Colombo, Ceylon** construction costs have increased only slightly since last year. Local shortages have caused cement price fluctuations (the country produces about one-third of its cement needs, the rest is imported.) Skilled labor is plentiful and there is a surplus of unskilled. The government's six-year development plan, which may be launched in October, includes some large jobs on which American contractors may want to bid: irrigation and hydro-electric power plant; cement plant; certain stages of the Laxapana hydro-electric plant; and a large reclamation project including new buildings near Colombo.
- **Manila, Philippines** has a good supply of most construction materials, although copper sheet and some structural shapes are short. Good mechanics and equipment operators are hard to find but there is a surplus of unskilled construction workers. Most construction material prices are at their lowest level since controls went into effect. Much of the decline is due to more local producers.
- **Winnipeg, Canada,** reports construction materials, particularly cement and steel are in very short supply. During June cement scarcity held up construction in areas outside Winnipeg. Skilled and unskilled labor are plentiful. Construction activity is running about 15% ahead of last year in the Province of Manitoba.
- **Ottawa, Canada,** has a good supply of construction materials and labor is reported reasonably plentiful. Construction activity is slightly above '54 and is picking up.

Canada Construction Cost Indexes—1949 = 100

Central Mortgage and Housing Corp.

Non-Residential				Residential			
'39	57.9	'48	95.3	'39	48.1	'48	95.0
'40	60.0	'49	100.0	'40	51.2	'49	100.0
'41	63.9	'50	105.2	'41	56.0	'50	106.1
'42	67.2	'51	118.9	'42	60.0	'51	123.2
'43	69.5	'52	125.4	'43	63.7	'52	126.7
'44	70.5	'53	127.4	'44	66.4	'53	127.4
'45	71.1	'54Jun	127.7*	'45	67.2	'54Jun	128.5*
'46	75.0	'54	127.7	'46	70.4	'54	128.3
'47	84.3	'55Jun	129.5	'47	80.9	'55Jun	131.4

Weighted indexes of wholesale prices and wage rates. Intangibles, productivity, etc., not included. * Revised

Canadian Wage and Cost of Living Changes—1945–'55

Unweighted average wage increases for 8 principal construction occupations (including vacation pay allowances)

	Per cent increase in wages				in cost of living			
City	'45-'55*	'52-'53	'53-'54	'54-'55	'45-'55	'52-'53	'53-'54	'54-'55
Halifax	86.7	3.0	1.8	7.0	47.7	−2.7	0.1	0.7
St. John	84.0	4.3	0.3	3.6	54.5	−2.1	0.3	0.9
Montreal	99.6	1.8	5.0	1.6	55.9	−0.6	−0.1	−0.8
Toronto	104.9	2.8	4.1	3.1	56.9	−0.6	1.4	−0.4
Winnipeg	98.6	7.3	0.0	7.9	52.9	−1.1	0.3	−0.4
Saskatoon	108.9	6.7	3.6	2.5	54.5	1.1	0.2	0.2
Edmonton	101.4	4.6	4.2	1.4	50.5	0.3	0.1	−0.9
Vancouver	111.1	10.8	2.3	1.7	58.9	−0.4	0.3	−0.2
Average, 8 cities	99.8	5.2	2.9	3.3	54.1	−0.8	0.4	−0.1

* 10/'45 to 7/'55; other % changes July 1 to July 1.

Canadian Building Trades Wage Rates July 1, 1955

Dominion Department of Labour, and Canadian Construction Assoc.

	Bricklayers				Carpenters				Electricians				Painters			
City	1939J	1945J	1954	1955	1939J	1945J	1954	1955	1939J	1945J	1954	1955	1939J	1945J	1954	1955
Halifax[a]	$1.00	$1.15	$1.81	$1.94	$0.70	$0.95	$1.56	$1.69	$0.85	$1.06	$1.66	$1.79	$0.60	$0.81	$1.37	$1.45
Saint John	0.90	1.10	1.80	1.85	0.50–0.60	0.81	1.53	1.55	0.50–0.65	0.85	1.57	1.57	0.50–0.55	0.76	1.34	1.40
Quebec	0.75–0.85	1.00	1.70	1.80	0.55–0.60	0.80	1.50	1.60	0.55–0.65	0.80	1.45	1.60	0.50–0.55	0.75	1.45	1.50
Montreal	0.80–0.90	1.06	2.00	2.00[e]	0.70	0.96	1.80	1.80[e]	0.75	1.01	1.90	2.00	0.66	0.86	1.70	1.70[e]
Toronto	1.00	1.23	2.35	2.46	0.90	1.11	2.20	2.30	1.00	1.21	2.33	2.50	0.75	0.97	1.95	1.95[f]
Hamilton	0.90	1.19	2.30	2.35	0.75	1.04	2.10	2.15	0.75	1.05	2.25	2.25[f]	0.65	0.86	1.65	1.65[d]
Windsor	1.15	1.26	2.40	2.45	0.95	1.18	2.17	2.22	1.15	1.26	2.35	2.35[f]	0.60–0.65	0.95	1.80	1.80–1.90
Winnipeg	1.10	1.25	2.10	2.25	0.85	1.05	1.90	2.05	0.85	1.05	1.90	2.05[b]	0.70	0.90	1.65	1.65
Saskatoon	1.00	1.20	2.18	2.23	0.50–0.75	0.96	1.85	1.90	0.70–0.80	0.93	2.00	2.00	0.50–0.70	0.70	1.65	1.70
Edmonton	1.10	1.31	2.30	2.30	0.90	1.03	1.95	2.00	0.85	1.06	2.25	2.25	0.80	0.91	1.65	1.65[d]
Vancouver	1.10	1.29	2.40	2.40	0.75–0.90	1.12	2.22	2.22	0.75–1.00	1.19	2.30	2.42	0.63–0.80	0.97	2.12	2.16

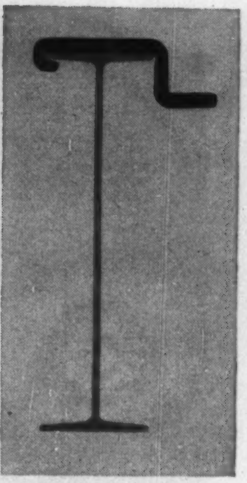
	Plasterers				Plumbers				Sheetmetal Workers				Labourers			
City	1939J	1945J	1954	1955	1939J	1945J	1954	1955	1939J	1945J	1954	1955	1939J	1945J	1954	1955
Halifax[a]	$0.80	$0.95	$1.70	$1.83	$0.85	$1.025	$1.65	$1.78	$0.70	$0.85	$1.47	$1.55	0.30–0.40	$0.52	$1.10	$1.18
Saint John	0.90	1.10	1.80	1.85	0.60–0.70	0.88	1.55	1.60	0.50–0.65	0.81	1.25	1.50	0.30–0.40	0.53	0.75–1.15	0.75–1.15
Quebec	0.75	1.00	1.70	1.80	0.55–0.65	0.80	1.45	1.60	0.55–0.65	0.80	1.50	1.60	0.40	0.60	1.15–1.25	1.20–1.30
Montreal	0.80	1.06	2.00	2.05[g]	0.75	1.01	2.00	2.10[g]	0.65–0.75	0.96	1.80	1.80[e]	0.40	0.61	1.25	1.25[e]
Toronto	0.90	1.21	2.40	2.40[h]	1.00	1.17	2.35	2.35[d]	0.93	1.18	2.25	2.35[f]	0.35–0.50	0.67	1.25	1.30[c]
Hamilton	0.90	1.07	2.25	2.30	0.85	1.07	2.15	2.30	0.75	1.04	2.15	2.30	0.35–0.45	0.65	1.10–1.15	1.15
Windsor	0.90	1.15	2.20	2.10	1.00	1.25	2.35	2.35	0.70–0.85	1.06	2.20	2.25	0.55	0.75	1.62–1.67	1.66–1.71
Winnipeg	1.10	1.25	2.10	2.25	0.95	1.15	2.00	2.15	0.70	0.85	1.75	1.90	0.40–0.45	0.63	1.05–1.25	1.10–1.30
Saskatoon	0.75–1.00	1.06	1.80–2.00	1.80–2.20	1.00	1.06	2.00	2.10	0.75–0.90	0.81–0.85	1.80	1.80	0.30–0.40	0.58	1.28	1.33
Edmonton	1.05	1.31	2.225	2.225	1.05	1.16	2.25	2.25	0.90	1.07	2.05	2.15	0.40–0.50	0.61	1.30	1.35
Vancouver	1.00	1.10	2.30	2.35	1.00	1.19	2.35	2.35	1.00	1.18	2.25	2.30[d]	0.45–0.50	0.71	1.60	1.60[d]

Hourly allowance in lieu of vacation pay are not included. Allowances for above trades are: Halifax, 3¢ for all skills except 4¢ for carpenters & electricians and none for labourers; St. John, 2%; Quebec, 2%; Montreal, 2%; Toronto, 4%; Hamilton, 4% except 2% for painters; Windsor, 4%; Winnipeg, 4% except 2% for electricians; Saskatoon, 4%; Edmonton 4%; Vancouver, 2% except 4% for carpenters, plumbers & sheet metal workers *J Rates as of June 1

[a] 1939 & 1945 rates include allowance in lieu of vacation pay [b] $2.10, 9/1/55 [c] $1.35, 10/1/55 [d] negotiating [e] decision pending on arbitration board award

[f] in conciliation [g] $2.12, 10/1/55 [h] $2.46, 8/1/55

NEW YORK ENGINEER DEVELOPS NEW SYSTEM FOR FORMING FLOORS



J&L Junior Beam and the "K" clip

A New York 12-story structure seldom makes news, but the $1,200,000 apartment building shown below is an exception. Its design incorporates a new method of forming floors which substantially reduces the over-all building costs.

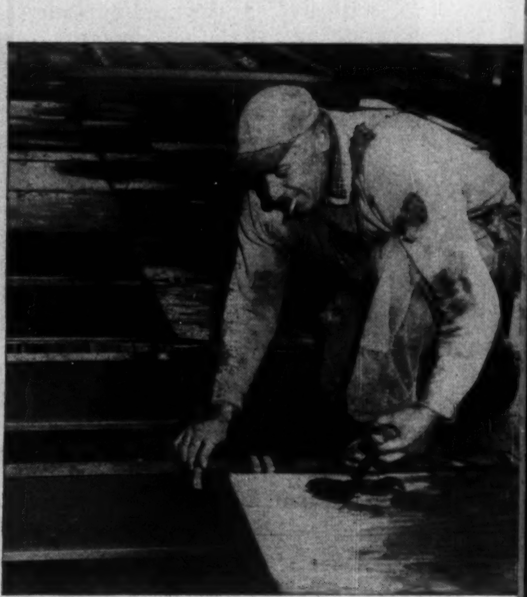
Developed by veteran consulting engineer, E. S. Klausner, the "K" system uses J&L Junior Beam construction to get low-cost, fast steel erection, and a small cast iron clip that speeds the laying and stripping of concrete forms.

Once the Junior Beams are framed into the main structural members, "K" clips are placed along the top flange of the beams. Next, 2x8' sheets of plywood are placed between the beams so that they rest on the clips and serve as ready-made forms for the concrete.

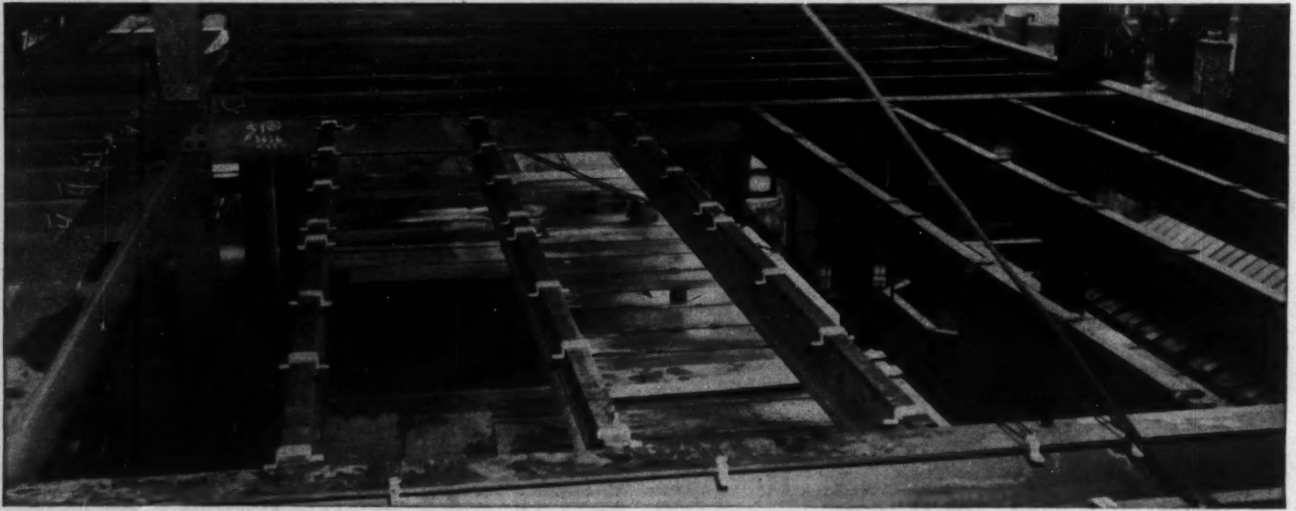
The design of the clip allows the concrete to extend ¼" below the top flange of the beam, thus bracing the top flange of the Junior Beams along their entire length. This provides greater rigidity and eliminates the need for bridging. Finally, the forms are stripped simply by breaking off the exposed "tail" of the clip and allowing the forms to drop.

New 12-story apartment at 236 E. 35th Street in which the "K" system for forming floors was specified. Architects are Maxon, Sells and Ficke of New York.

Junior Beams are easily handled. As 16-foot length of 8-inch section weighs only 100 pounds, two men can position and bolt in a beam without tying up crane or derrick.



Hooking "K" clip over the flange of a Junior Beam to hold the 2' x 8' x ⅝" plywood sheet used as concrete forms. Clips are placed every 2½ feet along the beam.

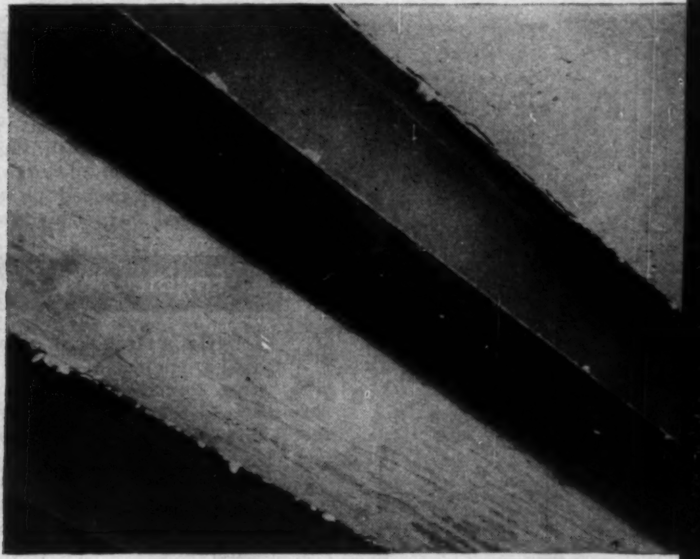


Junior Beam floor joists are framed into the main members of the structure on approximately 26" centers. "K" clips can be seen in position hooked over the upper flange of the beams.

Ease of laying forms is demonstrated by workman. One carpenter and three laborers were able to place forms at the rate of 6-7,000 square feet a day.

Stripping forms. Light blow fractures exposed "tail" of cast iron clips, allowing forms to drop. The "K" clip will withstand a dead load of 1,000 pounds but fractures readily under impact.

Light tug removes forms. Two men strip 6-7,000 square feet a day. Forms can be easily stacked and re-used 20 or more times.



Bracing is eliminated. Upper flange of Junior Beam is encased in the floor slab and supported along its entire length.

Floor Forming Method Geared for Speed and Economy

The Junior Beams were economically fabricated by simply welding a pre-punched end plate to the web of the beam.

On the job, Junior Beams helped speed erection. Whitey Sapilla, Superintendent of the erection crew reported, "these J&L Junior Beams handle easily . . . sorting the steel is no problem. We raise the beams in bundles and two men can distribute and position them without tying up a crane or derrick."

Use of "K" clip makes laying and stripping the concrete forms a simple matter. One carpenter and three laborers were required, yet forms were going in at the rate of 6-7,000 square feet a day. Two men could strip 6-7,000 square feet in a day . . . and forms were re-used more than 20 times.

J&L
STEEL

The "K" system is an outstanding example of sound engineering employing the strength and adaptability of lightweight Junior Beams to materially reduce construction costs. Write today for complete information showing how Junior Beams are used as floor joists, and roof purlins with loading and spacing tables for various spans. The coupon is for your convenience.

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Bayley's specialization and leadership in the design and manufacture of windows includes 30 years of pioneering experience in development and perfection of curtain wall systems — giving Bayley a strong lead in meeting today's design trends. A list of the country's outstanding industrial, commercial, public and multiple-residence buildings featuring Bayley Windows is also a list of fully satisfied Bayley customers.

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The skill and experience of Bayley's design engineers and service experts is always at "beck and call", through a nationwide organization of well-staffed company offices, supported by trained, franchised agents. The scope of service extends from consultation at the building's inception to actual window performance at the time of occupancy.

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You can be sure that every Bayley Window is *Bayley-made;* produced in Bayley plants by Bayley's own careful craftsmen and production technicians, whose long-accumulated skills in the art of making top-quality windows are supplemented by the finest and most modern manufacturing facilities available.

Design Leadership

Bayley has an outstanding record for *anticipating* new needs in window design, construction and operation . . . and for meeting new and changing requirements with improved windows that assure better combinations of light, air, vision, beauty and strength. And Bayley has tempered this pioneering of new trends by insistence on persevering in quality construction. Many Bayley "firsts" in window features have become standard for the industry.

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where the *other* services also count — it's always

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Shortages Add to Materials Price Increases

The rise in materials prices this year has been accompanied by shortages that delayed deliveries, reinstated allocations and otherwise disrupted work schedules. These began to show up in May and June and continued to be troublesome into September.

The uptrend picked up momentum when the steel price rise more than doubled last year's. Fir prices continued up but not at the rate that followed last year's long strike but pine's increase was almost six times last year's rate. This price movement for eight major construction materials is compared in the accompanying table.

The non-ferrous metals saw a sensational rise in copper from 30¢ per lb in April to 43¢ in September and up to 52¢ from "irregular" suppliers. But the world price went up to 47¢ in London. Aluminum sheets increased 6 percent for flat, 13 percent for corrugated. Stainless steel flat sheets increased 6-7 percent.

Structural steel bookings were up 33 percent in the first half but shipments lagged 13 percent. In Cleveland delivery required 120 days, in San Francisco until October or November for June orders. In Kansas City 30-day delivery on reinforcing bars early in the year stretched to 60 days in the spring, 90 days during the summer. September steel deliveries in Baltimore are coming in 60-90 days behind schedule and no deliveries on large orders of structurals are being promised until the first quarter of '56.

Cement shortages are world wide. By June they were critical in Dallas, in Indiana, Southern California, Ohio. By July, Boston and Minneapolis had major troubles, in August Chicago and Iowa joined the list and in September St. Louis. Cleveland shortages eased but Cincinnati's troubles increased with diversion of cement from that area to flood disaster areas. Ohio brought in Canadian cement but Canada has shortages too. Several ready-mix plants in St. Louis had to close down in September. A 40-mile section of the Kentucky Turnpike faces delay and many jobs in Chicago are delayed for lack of cement. Some private work in Baltimore is using bagged imported cement while ready-mix plants are going as far as Tennessee for supplies. Fortunately cement companies have launched expansion programs that will help prevent future shortages.

Plywood shortages in June and delivery difficulties on lumber resulted from a serious boxcar shortage when mills could get only 50 percent of the cars needed. No relief was expected until fall.

The ENR cost indexes' materials component is up 7.5% since last September due to rises in prices of cement, structural steel and lumber. Individually this is how these went up: cement 3.2%, steel 8.2%, fir 7.4% and pine 8.8%.

Materials that are not included in the cost indexes showed these price increases for the year: sand 5.4%, common brick 4%, ready-mixed concrete 3.3%, structural clay tile 0.4%, all based on 20-cities average.

Building Materials Prices

ENR average yearly prices at New York, except steel

Year	Brick common per M	Cement per bbl	Lime per bbl	Pine per M ft bm	Steel shapes per cwt h
1874....	$7.41	$1.48R	$1.50a	$26.00d	....
1898....	6.65	2.25R	.95a	21.75d	....
1907....	6.16	1.55C	.95a	30.50d	1.75
1913....	6.75	1.18C	.915a	25.04e	1.50
1929....	11.71	2.23C	2.25b	64.50f	1.92
1932....	9.75	1.62C	2.25b	39.91f	1.56
1938....	13.10	2.12C	2.80b	59.33f	2.18
1939....	13.46	2.20C	2.80b	64.35f	2.10
1942....	14.17	2.20C	2.80b	85.61f	2.10
1947....	26.38	3.46C	24.34c	115.83g	2.61
1948....	30.33	4.05C	26.32c	114.38g	2.98
1949....	33.00	3.32p	26.80c	98.13g	3.25
1950....	33.50	3.52p	27.10c	131.88g	3.42
1951....	37.92	3.78p	31.00c	154.79g	3.65
1952....	36.45	3.84p	32.00c	155.00g	3.73
1953....	35.33	3.97p	32.00c	156.67g	3.98
1954....	38.92	4.01p	32.00c	157.21g	4.16

BRICK: wholesale, fob; **CEMENT:** net, delivered R Rosendale, rest Portland C in cloth bags delivered (1949–$4.23) price of bags included °p in paper bags, fob city in carload lots **LIME:** °a common lump, wholesale, fob, 180 lb., net °b 280 lb. °c common hydrated, delivered, per ton (40 bags of 50 lb. ea) no longer quoted per bbl. **LUMBER:** No. 1 common, rough °d 1-in. yellow pine, wholesale at dock °e 3-in. LLYP °f 3x12 LLYP from Lumber Trade Jl. °g 3x12 SLYP (LLYP out of market) **STEEL:** h fob Pittsburgh.

Material Prices & Movements 20 cities' average

	Unit	1954	1955	% Change from previous year 1954	% Change from previous year 1955
Cement bulk	bbl	$3.457	$3.567	+3.9	+3.2
Structural steel, (3-mill aver.)	cwt	4.250	4.600	+3.7	+8.2
Sand	ton	2.251	2.372	+3.1	+5.4
Lumber, 2x4 Fir	Mbm	113.000	121.388	+11.1	+7.4
Lumber, 2x4 Pine	Mbm	92.300	100.466	+1.5	+8.8
Common brick	M	33.237	34.580	+1.4	+4.0
Ready-mixed concrete	cy	12.199	12.601	+2.2	+3.3
Structural clay tile, 3x12x12	M	161.938	162.571	+1.5	+0.4

Materials Prices Reported Monthly for 22 Pricing Centers

ENGINEERING NEWS-RECORD carries prices in each of 20 U. S. and 2 Canadian cities on the following construction materials. These are checked by field reporters direct with producers or distributors.

These prices are quoted and requoted on the same quantity, the same assumed destination, the same units in order that they will truly reflect basic price movements. These materials are:

Portland Cement, Sand and Gravel, Crushed Stone, Crushed Slag, Concrete Block, Concrete.

Paving Brick and Block, Paving Asphalt, Asphalt Binders—Fluxes, Cutback Asphalt, Road Oil, Asphalt Emulsion.

Structural Shapes, Reinforcing Bars, Expanded Metal Lath, Welded Fabric Reinforcing.

Cast Iron Pipe, Asbestos Cement Pipe, Vitrified Sewer Pipe, Clay Drain Tile, Concrete Sewer Pipe, Wrought Steel Pipe.

Short Leaf Yellow Pine and Douglas Fir, Long Leaf Yellow Pine, Plywood, Piles, Railway Ties.

Window Glass, Explosives, Water, Sewage Treatment and Chemicals for Road Work.

Structural Clay Tile, Partition-scored, Structural Clay Tile, Load Bearing-scored, Brick, Lime.

Red Lead, White Lead, Ready-Mixed Paint, Roofing Supplies.

Plaster, Vermiculite, Aluminum Sheet, Stainless Steel Sheet—Type 302, Copper Water Tubing—Type L.

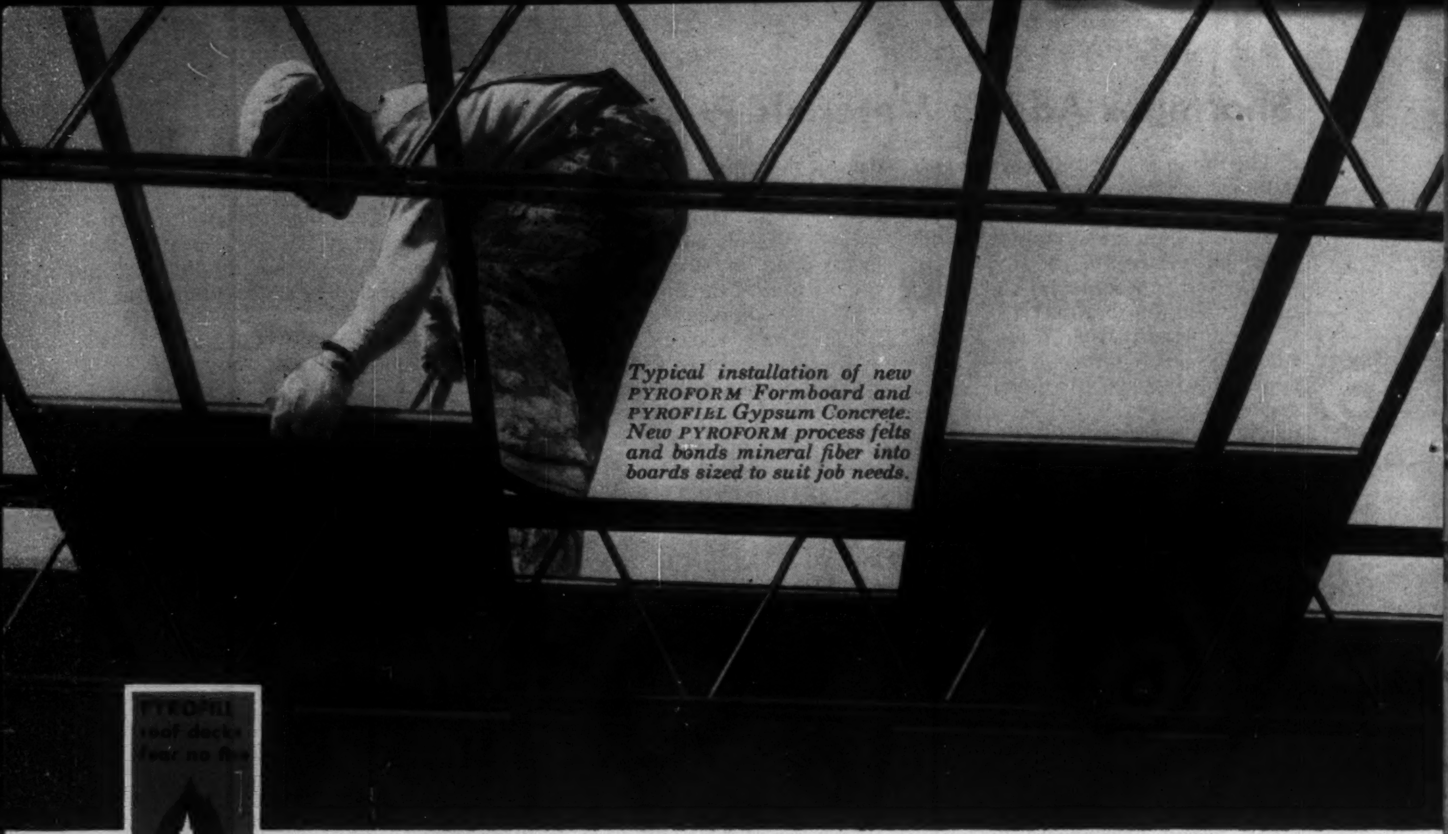
Gypsum Plaster Board, Gypsum Board Lath, Gypsum Sheathing, Fiber Board Sheathing, Fiber Board Insulation, Mineral Wool Insulation, Insulation, Aluminum Foil 60 Kraft Expansible.

These price pages are in the first issue of ENR each month except when the first Thursday falls on the 1st, 2nd or 3rd of the month. In those months the five price and wage pages are in the second issue. They were pages 68, 69, 70, 72 and 73 in ENR, September 8, 1955.

The October prices will be in the October 6 issue.

Reprints of the September 8 price pages are available free.

Address request to: Manager, Business News Department ENGINEERING NEWS-RECORD, 330 West 42 St., New York 36, N. Y.



Typical installation of new PYROFORM *Formboard and* PYROFILL *Gypsum Concrete: New* PYROFORM *process felts and bonds mineral fiber into boards sized to suit job needs.*

PYROFILL roof decks fear no fire

NEW roof deck system fights fire... insulates... absorbs sound

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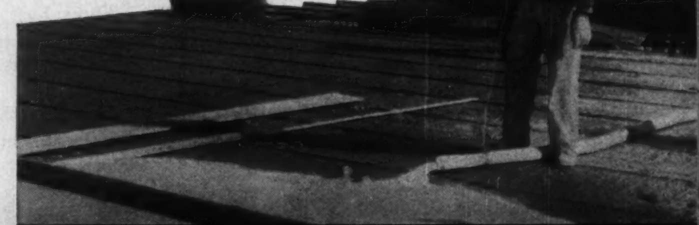

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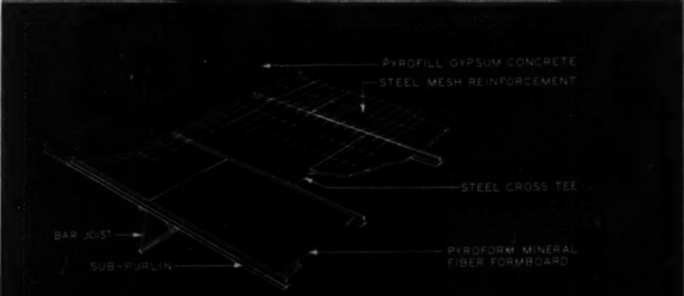

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PYROFORM-PYROFILL roof decks have a U factor of .16. An excellent sound absorber—PYROFORM formboard has an NRC of .75. PYROFORM-PYROFILL weighs only 10 to 12 lbs. per sq. ft., saving on structural steel and footings. PYROFILL sets in less than an hour and is then capable of carrying normal construction loads. A single crew can pour from 20,000 to 30,000 sq. ft. per day, ready for roof covering.

FOR FREE SAMPLE OF PYROFORM and full information, write Dept. ENR-2, 300 W. Adams St., Chicago 6, Illinois.

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Wholesale Prices

Building materials are up 27.4 percent from their 1947-49 averages. This increase is about 8% greater than the rise in other industrial products in the same period. So says the Wholesale (Primary) Price Index of the Bureau of Labor Statistics.

In August 1955 the BLS Building Materials Price Index was 125.7 compared with 117.4 for other industrial products, both based on 1947-49 as 100. In 1952, with Korea fighting still on, the Building Materials Price Index was 118 only 4.4 percent higher than the price index for other industrial prices.

The biggest price rises since 1947-49 are in these products which BLS includes in its Building Materials Index: structural shapes 57.5%, fans and blowers $54.4%, incandescent lamps 47.2%, metal doors 46.4%, structural clay products 42.9%, Douglas fir 34.1%, building paper and board 33.3%, portland cement, 31.8%, plumbing equipment 28.1%, concrete ingredients 25.3%, elevators and escalators 22.6% and gypsum products 22.1%.

Sizeable increases came in: heating equipment 15.5%, southern pine 15.1%, asphalt roofing 14.5% and softwood plywood 10.7%.

Wholesale Price Index, Building Materials

Bureau of Labor Statistics, 1947–49 = 100

Month	1947#	1948#	1949#	1950#	1952	1953	1954	1955
Year	94.0	104.0	102.0	109.5	118.2	119.9	120.2	.....
Jan	88.7	100.7	105.4	102.1	117.8	118.4	119.6	122.1
Feb	89.9	101.2	104.9	103.2	117.9	118.7	119.2	122.5
Mar	91.5	101.8	104.4	104.1	118.0	119.2	119.3	122.8
Apr	92.8	102.0	103.4	104.7	118.2	119.9	119.0	123.4
May	93.0	102.5	102.4	106.3	118.1	120.2	118.6	124.1
June	92.8	103.1	101.5	107.5	117.8	120.5	118.5	124.1
July	93.4	104.5	100.3	109.1	118.0	121.3	120.5	125.7
Aug	94.9	106.7	99.7	112.0	118.6	120.8	120.8	127.4p
Sept	96.2	107.0	99.9	114.4	118.7	120.4	121.3	.....
Oct	97.1	106.6	100.2	115.8	118.6	120.0	121.7	.....
Nov	98.3	106.3	100.6	116.3	118.4	119.5	121.9	.....
Dec	99.2	105.9	101.2	118.3	118.3	119.6	122.0	.....

Official beginning January, 1952 # Unofficial—for official Index for these years see the 1926 = 100 wholesale price index discontinued by BLS 1952 p preliminary

Construction Materials Prices in 20 Cities

Market quotations on construction materials as reported to Engineering News-Record

ENR 20-Cities	CEMENT, Bulk per bbl CL lots, fob city Incl. Dealer Disc 1954 Low	CEMENT 1954 High-Dec.	SAND, per ton Truck lots or over fob city 1954 Low	SAND 1954 High-Dec.	CONCRETE, READY MIXED 1:2:4 over 50 cy per cy delivered 1954 Low	CONCRETE 1954 High-Dec.	BRICK, CLAY BACKING per M quantity delivered 1954 Low	BRICK 1954 High-Dec.	STRUCTURAL CLAY TILE Partition, Score, 3 x 12 x 12, per M, 2000 pieces or over delivered 1954 Low	TILE 1954 High-Dec.
Average	3.35	3.48	2.20	2.30	11.98	12.24	32.91	33.29	158.45	162.59
Atlanta	3.56	3.56	1.83	2.50	12.06	12.06	27.38	27.38	195.00	195.00
Baltimore	3.60	3.60	2.00[f]	2.00[f]	11.45	11.45	36.00	36.00	186.00	186.00
Birmingham	2.60[b]	2.75[b]	2.08	2.08	11.00	11.00	23.50	26.50	126.00[p]	126.00[p]
Boston	3.84	3.96	2.50	2.50	12.00[j]	12.50[j]	36.85[p]	36.85[p]	196.00[q]	196.00[q]
Chicago	3.17	3.32	3.65[fg]	3.65[fg]	11.94	12.00	26.00	26.00	135.00	135.00
Cincinnati	3.55	3.55	2.24[fh]	2.24[fh]	10.95	10.95	45.00[p]	45.00[p]	185.00[p]	185.00[p]
Cleveland	3.19[b]	3.19[b]	1.65	1.65	14.95[k]	15.50[k]	34.50	34.50	170.00	170.00
Dallas	2.85	2.85	1.84	1.84	9.40	9.40	19.75	19.75	......	......
Denver	3.74	3.94	1.20	1.20	10.50	10.50	34.00	34.00	......	......
Detroit	3.02[c]	3.17[c]	4.00[fg]	4.00[fg]	12.00	12.70	37.25[p]	37.75[p]	130.00	130.00
Kansas City	3.22	3.47	1.50[f]	1.85[f]	12.00[l]	12.75[l]	28.50	28.50	127.50	127.50
Los Angeles	4.00[a]	4.26[a]	2.11	2.21	11.78[m]	11.88[m]	27.50[q]	27.50[q]	......	......
Minneapolis	3.64	3.79	1.50[f]	1.60[f]	12.75	13.25	35.00	35.00	175.00[p]	175.00[p]
New Orleans	3.02	3.17	1.82	2.00	12.90	12.90	31.00[p]	31.00[p]	170.00	170.00
New York	3.70	3.70	1.80[gi]	1.90[gi]	13.55[n]	14.05[n]	37.00	41.00	140.95[r]	147.30[r]
Philadelphia	3.45	3.45	2.35[f]	2.35[f]	12.50	12.50	32.00	32.00	145.30	156.30
Pittsburgh	3.19	3.34	2.20[f]	2.20[f]	13.00	13.00	36.00	36.00	112.00	138.00
St. Louis	3.22[d]	3.38[d]	2.60[d]	2.60[d]	11.40	11.90	40.00	40.00	142.00[p]	150.00[p]
San Francisco	3.16	3.27	2.02	2.17	11.25[o]	12.15[o]	37.00	37.00	156.85[tu]	156.85[tu]
Seattle	3.35[a]	3.55[a]	3.00[dfg]	3.50[dfg]	11.40	12.30	34.00	34.00	223.00[p]	223.00[p]
Montreal	2.86[e]	2.96[ae]	2.25[h]	2.25[h]	10.55	10.55	38.50	39.50	165.00	165.00

[a] subj to 10¢ disc [b] truckload lots, destination price [c] mill price plus freight [d] less 2% for cash [e] Dec. $2.88 [f] delivered [g] per cy [h] 5 tons or more [i] barge lots asd [j] 50¢ cash disc [k] 7-9 mi zone [l] 25 cy plus [m] 1:2¼:4 mix [n] 5 cy or more deliv Man [o] 10-100 cy [p] truck loads [q] fob yard [r] fob trucks, job site [s] Dec. $147.00 [t] smooth [u] fob Stockton

LUMBER, No. 2 Common or better, 2 X 4 s4s

ENR 20-Cities	Short Leaf Yellow Pine 1954 Jan. High	Short Leaf Yellow Pine 1954 Low	Short Leaf Yellow Pine 1954 Dec.	Short Leaf Yellow Pine 1955 Jan.	Short Leaf Yellow Pine 1955 Aug.	Douglas Fir 1954 Jan. High	Douglas Fir 1954 Low	Douglas Fir 1954 Dec.	Douglas Fir 195 Jan.	Douglas Fir 195 Aug.
Average	89.12[j]	94.33	94.33	95.20	100.07	99.82	115.51	113.50	114.22	120.81
Atlanta[a]	71.50[k]	73.50	73.50	73.50	73.50	......	......	......	......	......
Baltimore[b]	70.00[l]	87.00	87.00	85.00	92.00	89.50[t]	125.00	125.00	120.00	131.00
Birmingham[a]	70.50	73.50	73.50	80.50	80.50	70.50	108.50	108.50	108.50	108.50
Boston[ab]	94.00[c]	98.00[i]	96.00[i]	96.00[i]	107.00[i]	94.50[u]	113.00	112.00	115.00	124.00
Chicago[d]	86.50	93.50	90.00	90.00	95.00	97.00	114.00	109.00	111.00	118.00
Cincinnati[b]	77.00[m]	81.25	80.00	80.00	83.00	105.50[v]	109.25	105.50	105.50	112.50
Cleveland[d]	85.00[n]	99.00	99.00	96.00	103.00	92.00	114.50	104.00	107.00	118.00
Dallas[a]	60.00[o]	76.00	65.00	65.00	68.50	......	......	......	......	......
Denver[b]	......	......	......	......	......	101.00	122.00	117.00	117.00	121.50
Detroit[e]	97.00[p]	110.00	105.00	105.00	108.00	93.50	104.50	103.50	106.50	134.00
Kansas City[b]	102.50	110.00	110.00	110.00	120.00	105.00	130.00	125.00	129.00	125.00
Los Angeles[f]	......	......	......	......	......	85.00	112.00	97.00	97.00	107.00
Minneapolis[g]	......	......	......	......	......	135.00	145.00	145.00	140.00	140.00
New Orleans[a]	92.50	92.50	92.50	92.50	92.50	109.50	123.50	115.00	117.00	121.00
New York[h]	111.50[q]	120.00	120.00	122.50	125.00	117.50[w]	125.00	125.00	127.50	127.50
Philadelphia[e]	118.50	118.50	118.50	125.00	127.00	135.00	146.50	146.50	146.50	147.00
Pittsburgh[a]	92.50	97.50	95.00	95.00	106.00	115.00	125.00	125.00	125.00	130.00
St. Louis[g]	94.00[r]	110.00	110.00	112.00	120.00	109.75	125.00	121.00	122.00	139.50
San Francisco[a]	......	......	......	......	......	59.00	86.00	86.00	84.00	90.00
Seattle[a]	......	......	......	......	......	75.00	82.50	72.50	72.50	80.00
Montreal	85.00[ir]	92.00[i]	88.00[i]	88.00[s]	92.00[i]	110.00[x]	165.00	165.00	165.00	155.00

[a] fob mill [b] fob city, CL out of yard [c] asd [d] fob city CL dir mill [e] deliv to contr [f] retail LCL at yard [g] retail LCL deliv [h] deliv truck lots [i] spruce [j] Jan $91.05 [k] Jan $73.50 [l] Jan $78.50 [m] Jan $81.25 [n] Jan $87 [o] Jan $76 [p] Jan $100 [q] Jan $113.50 [r] Jan $99 [s] Jan $92 [t] Jan $94 [u] Jan $95 [v] Jan $106 [w] Jan $119.50 [x] Jan $165

Major Items Included in BLS Building Materials Price Index—1947–49=100

Major items	Weight %	August 15 1947	1948	1949	1952	1953	1954	1955
All building materials	100.0	94.9	106.7	99.7	118.6	120.8	120.8	127.4
Lumber & wood products	38.6							
Douglas fir	8.2	99.2	113.8	92.0	128.3	115.5	124.5	134.1
Southern pine	9.3	95.2	105.9	92.1	117.0	115.0	111.5	115.1
Other softwoods	7.1	91.0	111.7	103.2	129.7	134.8	130.2	138.4
Hardwood	6.3	96.0	108.7	90.8	110.9	115.8	112.1	120.4
Millwork	5.9	87.6	108.1	107.2	127.2	131.7	130.1	128.3
Softwood plywood	1.3	88.3	119.7	90.6	112.9	115.4	114.7	110.7
Hardwood plywood	0.5	96.1	105.8	92.9	101.1	110.9	98.8	102.6
Non-metal minerals	19.2							
Concrete ingredients	6.3	94.0	103.3	105.0	112.9	118.6	122.2	125.3
Portland cement	3.0	92.6	104.8	105.2	116.4	123.8	128.3	131.8
Concrete products	3.1	95.5	102.2	103.9	112.4	116.1	118.1	118.6
Prep. asph. roofing	3.1	94.4	103.6	102.6	106.0	105.8	98.6	114.5
Struct. clay products	2.5	93.9	104.2	105.2	121.3	131.3	132.1	142.9
Gypsum products	1.2	92.5	104.1	102.3	117.7	122.1	122.1	122.1
Other	3.0	not available						
Insulation matl	na	97.4	103.5	99.1	105.1	107.8	110.1	106.7
Metals & Metal products	29.5							
Structural shapes	1.4	89.9	112.4	112.4	134.9	141.9	146.2	157.5
Metal doors, sash trim	3.3	97.2	102.8	102.8	117.7	127.3	131.4	146.4
Heating equipment	9.5	95.0	102.7	102.5	113.7	115.4	114.0	115.5
Plumbing equipment	3.4	94.8	104.9	102.2	118.1	118.7	118.5	128.1
Other	11.9	not available						
Hardware (finished)	na	97.9	105.1	101.9	122.3	133.4	138.5	146.1
Paint & paint materials	6.8	97.0	100.9	96.5	106.9	106.3	108.3	n.a.
Prepared paints	6.5	98.7	100.6	98.0	110.6	110.7	112.8	114.8
Paint materials	0.3	93.3	101.7	93.1	98.1	96.0	97.8	97.6
Machinery & motive prod.	2.9							
Elevators, escalators	0.8	95.6	100.0	105.2	114.1	116.2	118.0	122.6
Fans, blowers	0.4	88.7	104.5	113.7	136.7	141.9	143.7	154.4
Incandescent lamps	1.7	95.9	104.6	104.6	117.9	136.9	136.9	147.2
Bldg. paper & board	1.6	91.8	105.5	103.8	115.8	123.0	127.9	133.3
Miscellaneous	1.4	not available						

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Sewage Treatment Plant, Merrill, Wis. — Contractor: Burger & Vicker, Inc., Wausau

Before ordering pumping equipment for this job, Burger & Vicker, Inc. tested two wellpoints—*in the ground*—Moretrench and another make of wellpoint which they had been using for several years.

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That did it! Moretrench got the order. Results were immediate—and perfect. 21′ of water disappeared fast.

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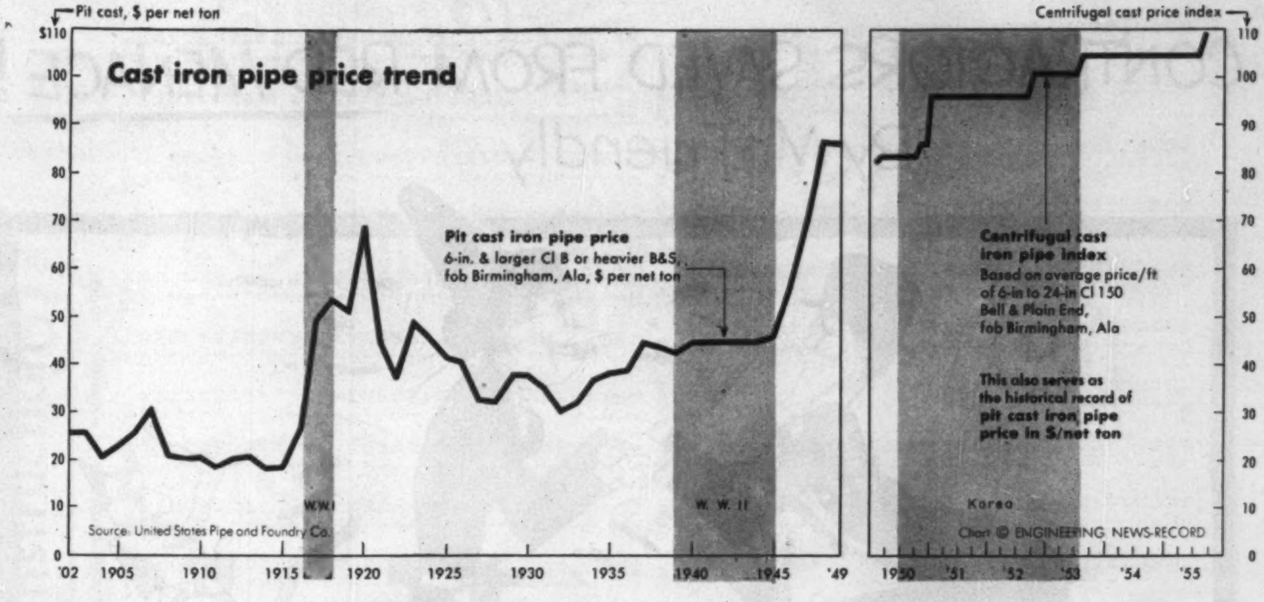
Western Representative: Andrews Machinery of Washington, Inc., Seattle 4, Washington
Canadian Representative: Geo. W. CROTHERS Limited, Toronto, Ontario



Index Measures Cast Iron Pipe Price Trend

A new index of cast iron pipe prices makes it possible to measure price trends in each of the ENR 20 Cities. The index, computed by the United States Pipe and Foundry Co., was introduced in ENR in August '55 (ENR Aug. 4, 1955, pp. 56 & 83). The table below completes the record of the indexes back to January, 1950, when production of centrifugal or spun cast iron pipe largely replaced output of Class B pit cast. Current values of these figures are published each month in the ENR Materials Price Report.

The index has a double use. While it measures the price trend for centrifugal cast pipe, fob city, it is also read directly as the historical price in $ per ton of Class B pit cast pipe, fob city. This is useful in appraising current values of pit cast pipe in existing installations.

The figures in the table below link at January, 1950 with Class B pit cast prices in 20 cities published monthly in ENR's Materials Price Report. Thus ENR readers have a complete historical price record of pit cast iron pipe prices in 20 cities going back many years.

Annual values of pit cast prices fob Birmingham, Ala. 1902-49 are in the table at the lower right. The chart above plots these prices and brings them up to date monthly using the new index for Birmingham. This chart shows how 24 months of stable prices in Birmingham ended with a 5% rise in August '55. The same is true for Chicago, Cleveland, Dallas, Denver, Detroit, Kansas City, Minneapolis, Philadelphia and Pittsburgh.

The cast iron pipe price index is calculated from the average price per foot, fob city, of centrifugal cast pipe. Sizes from 6-in. to 24-in., Class 150 Federal Specification WW-P-421 Bell & Plain End, in 18-ft. lengths are used. This average is divided by the factor of 2.27 to get the price index for the months January, 1950, through December, 1954. Beginning January, 1955, a change to Federal Specification WW-P-421a and the wider use of ASA Specifications A 21.6 (AWWA C-106), the index is computed by substituting Class 150 Standard Conditions Pipe and dividing by a factor of 2.44.

Pipe Price Trends In 20 Cities, 1950-55

Figures in table are Price Indexes for Centrifugal Cast Iron Pipe,* with carload freight allowed to city, which also serve as the historical record of the $ Per Net Ton Price of Class B Pit Cast Pipe.

	1/'50	2/'50-9/'50	10/'50-11/'50	12/'50-3/'51	4/'51-7/'51	8/'51-4/'52	5/'52-8/'52	9/'52-6/'53	7/'53-12/'53	1/'54-4/'55	5/'55-7/'55	8/'55
Atlanta	88.3	89.2	92.0	101.8	101.9	102.2	102.7	107.6	111.0	109.6	109.6	113.6
Baltimore	94.1	96.1	101.6	111.6	111.6	112.2	112.6	117.2	120.9	120.9	117.9	122.9
Birmingham	82.5	83.4	86.2	96.0	96.0	96.0	96.0	100.9	104.3	104.3	104.3	109.3
Boston	97.9	99.9	105.4	115.2	115.2	116.1	116.8	121.4	125.1	125.1	120.5	125.5
Chicago	97.0	97.9	100.7	110.5	110.8	111.4	112.7	117.6	121.0	121.0	121.0	126.0
Cincinnati	92.8	93.7	96.5	106.3	106.5	106.9	107.8	112.7	116.1	114.5	114.5	119.5
Cleveland	97.7	98.6	101.4	111.2	111.5	112.1	113.5	118.4	121.8	121.8	121.8	126.8
Dallas	96.7	97.6	100.4	110.2	110.5	111.1	112.4	117.3	120.7	120.7	120.7	125.7
Denver	101.2	102.1	104.9	114.7	115.1	116.1	118.1	123.0	126.4	126.4	126.4	131.4
Detroit	97.7	98.6	101.4	111.2	111.5	112.1	113.5	118.4	121.8	121.8	121.8	126.8
Kansas City	95.9	96.8	99.6	109.4	109.6	110.2	111.4	116.3	119.7	119.7	119.7	124.7
Los Angeles	99.4	100.3	103.1	113.7	114.2	115.2	116.5	121.4	125.4	125.4	126.1	131.1
Minneapolis	101.4	102.3	105.1	114.9	115.2	116.0	117.7	122.6	126.0	126.0	126.0	131.0
New Orleans	91.0	91.9	94.7	104.5	104.6	105.0	105.7	110.6	114.0	112.5	112.5	116.0
New York	93.1	95.1	100.6	110.4	110.4	110.3	110.6	115.2	118.9	118.9	116.5	121.5
Philadelphia	90.5	92.5	98.0	98.0	98.0	107.4	107.6	112.2	115.9	115.9	115.9	120.9
Pittsburgh	98.3	99.2	102.0	111.8	112.2	112.8	114.2	119.1	122.5	122.5	122.5	127.5
St. Louis	92.3	93.2	96.0	105.8	106.0	106.4	107.2	112.1	115.5	114.1	115.5	120.5
San Francisco	99.7	100.6	103.4	113.9	114.2	115.2	116.5	121.4	125.4	125.4	126.1	131.1
Seattle	99.7	100.6	103.4	113.9	114.2	115.2	117.1	122.0	125.4	125.4	126.1	131.1

Prices 1902-49

Pit cast, 6" & larger, Cl B or heavier B&S, fob Birmingham, Ala.

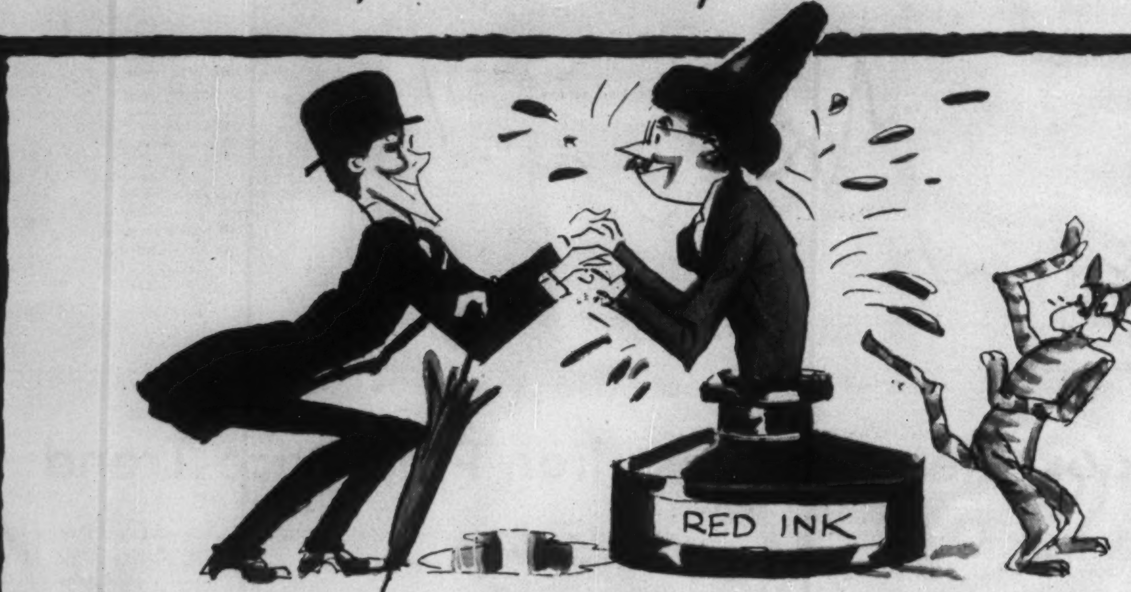
Year	$/ton	Year	$/ton
1902	25.83	1926	40.67
'03	25.85	'27	32.88
'04	20.13	'28	32.46
1905	22.79	'29	38.00
'06	25.46	1930	38.00
'07	30.75	'31	35.46
'08	21.08	'32	30.50
'09	20.46	'33	32.25
1910	20.92	'34	37.00
'11	18.92	1935	38.58
'12	20.46	'36	39.00
'13	21.00	'37	44.75
'14	18.58	'38	44.00
1915	18.89	'39	42.75
'16	26.16	1940	45.00
'17	49.68	'41	45.00
'18	53.85	'42	45.00
'19	51.17	'43	45.00
1920	68.92	'44	45.00
'21	44.50	1945	46.00
'22	37.33	'46	56.83
'23	49.17	'47	70.96
'24	45.88	'48	86.83
1925	41.67	1949	86.17

*** Based on average price per ft of 6-in. to 24-in. sizes Class 150 Federal Specification WW-P-421 Bell & Plain End Centrifugal Pipe in 18-ft. lengths for period January 1950 through December 1954. Beginning January 1955, based on same sizes but for Class 150 Standard Conditions Pipe, Federal Specification WW-P-421a and ASA Specifications A 21.6 (AWWA C-106.)**

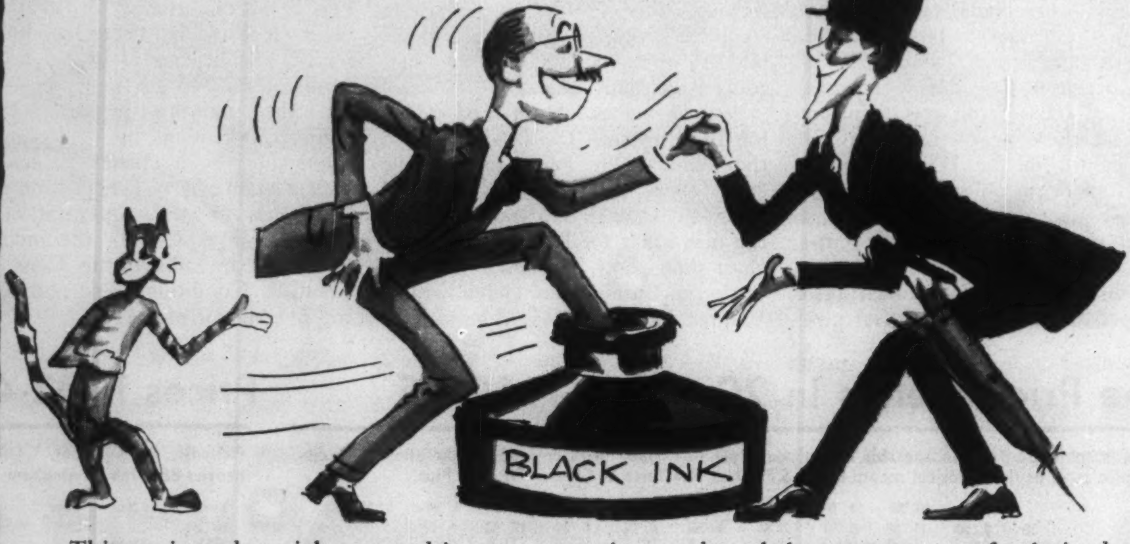
Source: United States Pipe and Foundry Co.

CONTRACTORS SAVED FROM RED MENACE!

By Mr. Friendly



In case after case American Mutual Safety Engineers have helped contractors *stay out of the red* by showing them how to cut accidents to way below average.



This service reduces job costs and insurance premiums and can help put a company firmly *in the black.* In 4 years, for example, The Kansas City Structural Steel Company saved $68,884. Documented case histories of savings like this are reported regularly in this magazine. Watch for them . . . find out how American Mutual helps contractors prevent accidents.

P.S. If you're interested in this money-saving service, write today for your free copy of "Foremanship and Accident Prevention in Construction." American Mutual Liability Insurance Company, Department O-136, 142 Berkeley Street, Boston 16, Massachusetts.

AMERICAN MUTUAL

A M

Service from salaried representatives in 78 offices!
Savings from regular substantial dividends!

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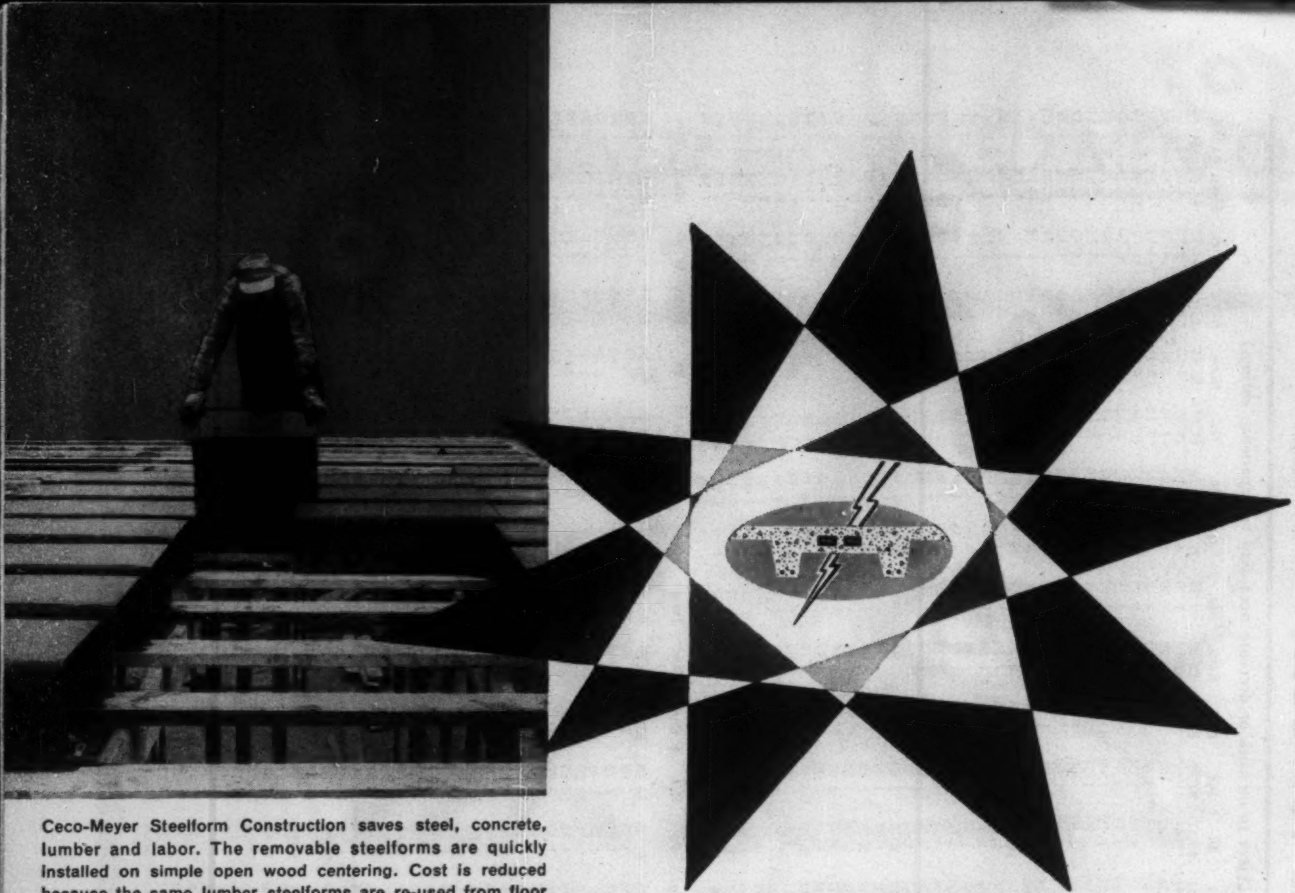
Base Rates on Compensation Insurance for Construction

Herbert L. Jamison & Co., Insurance Advisers and Auditors, New York, N. Y.—(Base rates in effect July 1, 1955—subject to increase or decrease according to experience ratings)

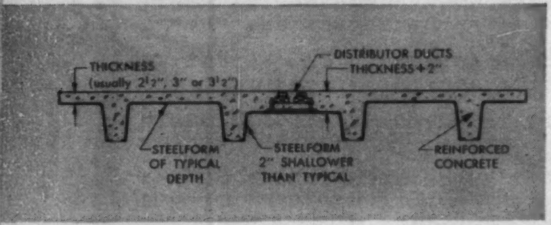
Classification of work	Ala.	Alas.	Ariz.	Ark.	Calif.	Colo.	Conn.	Del.	D. C.	Fla.	Ga.	Idaho	Ill.	Ind.	Iowa	Kans.	Ky.	La.	Me.	Md.	Mass.	Mich.	Minn.	Miss.	Mo.
Carpentry—1-2 family residences	$1.14	$3.47	$3.34	$2.55	$2.29	$1.72	$3.12	$1.40	$2.12	$2.78	$1.87	$3.11	$2.17	$1.72	$1 3	$2.03	$1.69	$4.51	$1.64	$2.07	$3.65	$2.30	$2.32	$2.60	$1.68
Carpentry—3 stories or less	1.14	3.95	3.34	2.75	4.26	2.29	4.38	1.40	2.51	2.78	1.87	3.11	2.68	1.96	1.94	2.13	1.76	5.00	1.64	2.33	4.53	2.30	2.32	2.65	2.08
Carpentry interior trim, cabinet work	.56	2.34	3.34	1.45	4.26	1.07	2.42	1.40	1.84	2.52	1.18	1.53	1.43	.92	.86	1.22	.96	2.36	.78	1.55	2.01	1.70	4.05	1.85	2.53
Carpentry general	1.50	7.94	3.34	4.08	4.26	2.83	5.66	1.40	2.68	4.16	3.67	6.80	3.96	2.53	2.45	3.39	2.42	5.22	2.24	3.10	10.44	2.30	4.05	5.56	2.92
Chimney construction, brick, concrete	4.13	12.22	7.89	10.17	12.20	8.13	15.88	A	12.58	13.35	8.41	12.99	8.74	7.04	5.64	10.00	8.17	17.32	5.23	10.56	6.99	9.48	11.03	12.81	12.80
Concrete work—bridges—culverts—C	2.24	A	6.05	4.30	5.28	4.43	7.89	1.30	7.45	4.97	4.16	6.86	4.41	3.10	3.73	3.86	3.18	6.02	3.73	5.03	8.14	3.77	5.70	6.77	4.31
Concrete work—3 stories or less—C	.69	6.75	2.44	1.28	1.02	1.29	3.99	1.30	3.30	2.79	1.00	2.47	1.75	1.06	1.14	1.68	1.17	2.35	1.32	1.81	5.24	1.35	1.87	1.72	1.66
Concrete work—general—C	1.34	7.14	2.94	2.49	2.86	2.79	6.36	1.30	3.80	3.45	2.69	3.86	3.27	1.71	1.77	3.32	1.81	4.99	1.86	3.03	7.77	2.12	3.14	2.84	3.54
Concrete or cement walks, floors, yards	.57	2.76	2.94	1.33	1.17	1.13	3.16	1.30	1.48	2.45	1.69	1.89	1.50	.97	1.13	2.03	1.05	2.57	.98	2.95	2.59	1.12	1.45	1.75	1.59
Electrical wiring	.77	1.83	2.11	1.63	1.56	1.29	1.94	5.00	1.53	1.84	1.46	1.73	1.30	1.06	.96	1.19	.91	1.84	.79	1.72	2.14	1.19	1.12	1.31	1.29
Excavation—earth—D	1.34	3.82	2.94	3.50	2.16	3.22	4.34	1.65	3.24	3.51	2.47	5.34	2.38	1.82	1.91	3.42	2.00	2.86	2.16	3.44	5.67	2.15	3.37	3.48	3.10
Excavation—rock—E	2.17	9.09	6.03	4.78	4.23	5.39	10.17	1.65	5.68	6.44	4.74	6.02	4.99	3.40	2.69	4.74	3.83	8.43	2.63	5.09	10.35	4.09	5.35	6.17	5.99
Glazing	1.57	4.33	3.01	3.67	3.22	2.98	6.00	A	4.26	3.87	3.41	4.55	3.25	2.23	2.28	3.48	2.75	5.00	2.09	3.88	5.55	3.03	4.31	4.64	3.38
Insulating	.63	3.50	A	1.53	2.45	1.41	2.44	1.40	2.19	1.74	1.07	2.56	1.69	1.09	1.19	1.56	1.25	3.07	1.31	1.50	3.69	1.11	2.95	2.31	1.56
Lathing	.74	3.50	2.09	1.92	1.40	1.41	3.12	.65	1.98	1.91	1.61	2.09	1.53	1.23	1.11	1.60	1.27	3.07	1.03	1.88	2.84	1.16	1.72	2.43	1.80
Masonry	.69	5.95	2.44	1.28	1.92	1.29	3.61	.80	1.87	2.10	1.17	2.47	1.77	1.28	1.14	1.68	1.17	2.35	1.32	1.91	5.24	1.45	1.57	1.72	2.05
Painting & decorating	1.08	4.77	2.43	1.81	2.80	1.89	4.95	1.45	3.05	3.59	2.05	3.54	2.07	2.40	1.38	1.73	1.79	3.50	1.60	2.88	A	1.84	1.65	2.74	2.77
Pile driving—building operations	3.70	9.10	8.40	9.84	9.99	7.85	7.03	4.55	8.63	8.79	7.62	11.66	7.21	4.28	4.21	9.16	6.20	15.79	2.59	7.99	9.74	5.07	7.94	10.87	8.06
Plastering	.63	3.50	2.53	1.53	1.40	1.41	2.44	.65	2.19	1.74	1.07	2.56	1.69	1.09	1.19	1.56	1.25	1.93	1.31	1.50	3.26	1.11	1.75	2.31	1.41
Plumbing	.80	1.82	1.89	1.62	1.87	1.41	2.12	.70	2.33	1.79	1.47	1.84	1.55	1.17	1.18	1.60	.98	2.32	.81	1.72	2.01	1.34	1.70	1.69	1.91
Roofing	2.34	8.95	5.29	6.47	6.35	4.98	7.51	1.20	5.41	4.85	5.02	8.73	6.31	5.64	5.55	5.92	3.57	5.33	3.36	7.45	18.48	4.36	5.59	5.82	4.61
Sheet metal work	1.04	3.04	2.44	2.26	2.13	1.61	3.19	1.20	2.21	2.69	2.35	2.61	1.87	1.72	1.41	1.77	1.49	2.96	1.11	2.24	2.56	1.50	1.50	2.94	1.91
Steel erection—door & sash	1.04	4.90	2.00	2.39	3.15	2.02	4.46	5.35	3.38	2.77	2.13	2.92	2.38	1.68	1.53	2.29	1.81	4.43	1.46	2.61	3.84	2.20	2.96	3.25	2.67
Steel erection—interior ornament	1.04	4.90	3.84	2.39	3.15	2.02	4.46	5.35	3.38	2.77	2.13	2.92	2.38	1.68	1.53	2.29	1.81	4.43	1.46	2.61	3.84	2.20	2.96	3.25	2.67
Steel erection—structural	4.35	19.60	12.79	11.51	13.68	12.62	19.00	5.35	20.22	12.75	10.60	17.57	8.84	5.98	9.42	11.11	8.61	11.91	6.52	9.91	21.91	12.76	10.49	10.86	12.45
Steel erection—dwelling—2 stories	2.60	10.77	5.40	5.96	13.68	5.06	10.34	5.35	6.67	7.32	5.49	8.98	6.68	3.40	3.72	6.04	4.67	8.57	3.58	6.27	12.97	4.43	7.53	7.77	7.64
Steel erection—general	3.16	11.05	12.79	8.01	6.45	8.40	11.12	5.35	13.31	10.79	8.95	12.44	7.56	4.17	6.42	6.72	4.15	11.91	4.16	8.56	15.48	4.45	8.49	9.98	4.94
Tile work—interior	.49	1.11	3.41	1.24	.99	.91	1.98	.65	1.88	1.28	.97	1.31	.96	.79	.74	1.05	.81	1.58	.70	1.27	2.01	1.06	1.44	1.58	1.06
Timekeepers and watchmen	1.09	5.95	F	2.25	F	2.05	4.63	F	2.80	3.45	2.33	3.01	2.68	1.78	1.62	2.38	1.79	4.56	1.51	2.72	4.53	2.16	3.06	2.86	3.31
Waterproofing—brush	1.08	4.77	2.43	1.81	2.80	1.89	4.95	.65	3.05	3.59	2.05	3.54	2.07	2.40	1.38	1.73	1.79	3.50	1.60	2.88	2.89	1.84	1.65	2.74	2.77
Waterproofing—trowel—interior	.63	3.50	2.53	1.53	1.40	1.41	2.44	.65	2.19	1.74	1.07	2.56	1.69	1.09	1.19	1.56	1.25	1.93	1.31	1.50	3.26	1.11	1.75	2.31	1.41
Waterproofing—trowel—exterior	.69	5.95	2.44	1.28	1.92	1.29	3.61	.65	1.87	2.10	1.17	2.47	1.77	1.28	1.14	1.68	1.17	2.35	1.32	1.91	5.24	1.45	1.57	1.72	2.05
Waterproofing—pressure gun	1.34	7.14	2.94	2.49	2.86	2.79	6.36	.65	3.80	3.45	2.69	3.86	3.27	1.71	1.77	3.32	1.81	4.99	1.86	3.03	7.77	2.12	3.14	2.84	3.54
Wrecking	5.55	15.99	20.48	14.68	17.76	12.26	20.10	9.50	15.54	12.81	10.91	18.05	10.69	5.78	8.26	9.68	9.49	17.78	8.45	15.32	21.59	11.45	12.66	14.39	15.49

Classification of work	Mont.	Neb.	Nev. G	N. H.	N. J.	N. Mex.	N. Y.	N. Car.	N. Dak. G	Ohio G	Okla.	Oreg.	Pa.	R. I.	S. Car.	S. Dak.	Tenn.	Texas	Utah	Vt.	Va.	Wash.	W. Vir. G	Wisc.	Wyo. G
Carpentry—1-2 family residences	$2.82	$2.21	$3.86	$2.16	$3.00	$3.24	$3.20	$1.83	$2.24	$1.81	$4.10	$4.65	$1.35	$3.78	$2.37	$1.20	$1.90	$2.84	$2.07	$2.24	$1.30	$4.10	$1.60	$2.27	$1.82
Carpentry—3 stories or less	2.82	2.21	3.86	2.46	3.10	3.71	4.80	2.04	2.24	2.07	5.08	4.65	1.35	5.08	2.37	1.20	1.90	2.84	2.07	2.24	1.36	4.10	1.76	3.04	1.82
Carpentry interior trim, cabinet work	1.35	1.07	1.85	1.33	1.40	1.84	A	1.44	3.91	.97	3.30	2.16	1.35	3.75	1.43	.83	1.26	2.10	2.07	.95	.83	1.35	.96	2.27	1.82
Carpentry general	4.25	3.15	5.82	3.58	4.00	5.93	5.00	3.79	3.91	2.67	5.37	5.47	1.35	7.44	5.11	1.68	3.41	4.06	2.07	3.17	2.30	5.42	2.42	3.04	1.82
Chimney construction, brick, concrete	12.68	8.19	17.37	9.70	11.30	13.62	27.50	10.57	10.67	7.42	16.65	A	A	32.29	12.50	4.57	8.95	11.72	10.56	6.51	5.32	A	8.17	10.74	9.29
Concrete work—bridges—culverts—C	6.23	4.01	8.54	6.31	4.90	8.88	8.00	3.67	5.51	3.27	9.02	7.18	1.45	16.85	7.25	3.14	3.76	4.87	5.67	4.11	2.04	6.74	3.18	4.83	4.99
Concrete work—3 stories or less—C	2.21	1.27	3.03	2.56	2.90	1.75	A	1.24	1.81	1.12	3.35	4.26	1.45	5.27	1.14	1.02	1.10	4.06	2.32	2.11	.83	4.00	1.17	1.54	2.04
Concrete work—general—C	3.95	2.81	5.41	4.14	4.90	3.15	6.00	2.68	3.04	1.80	7.41	4.89	1.45	9.51	3.25	1.99	2.28	4.06	2.77	2.35	1.95	4.59	1.81	2.72	2.44
Concrete or cement walks, floors, yards	1.69	1.55	2.32	1.65	2.15	2.49	3.20	1.43	1.40	1.02	2.74	2.34	1.45	4.22	2.00	.99	1.29	2.21	1.62	1.18	.76	2.06	1.05	1.74	1.43
Electrical wiring	1.52	1.28	2.08	1.61	1.90	2.73	3.00	1.36	1.08	1.12	1.95	2.42	2.25	2.63	2.11	.87	1.20	2.03	1.55	1.03	.86	2.27	.91	1.16	1.36
Excavation—earth—D	4.59	2.85	6.29	3.53	3.40	5.95	6.90	2.44	3.26	1.92	6.77	5.45	1.60	9.28	2.62	1.66	2.40	3.00	2.94	2.55	1.66	4.81	2.00	2.71	2.59
Excavation—rock—E	5.64	3.92	7.73	4.63	9.10	7.33	10.00	6.65	5.17	3.58	8.43	A	1.60	14.30	6.11	2.73	4.86	7.60	4.05	3.29	3.66	9.32	3.83	5.44	3.56
Glazing	4.14	3.00	5.67	3.68	4.10	5.06	5.20	3.69	4.17	2.35	5.35	4.92	A	11.16	4.63	2.00	3.46	3.00	1.28	2.57	2.09	4.61	2.75	4.11	1.13
Insulating	2.31	1.41	3.16	2.17	3.40	3.51	5.00	1.18	2.85	1.15	4.60	4.18	1.35	5.54	1.92	1.28	1.24	2.58	2.92	1.51	.78	3.61	1.25	2.85	2.57
Lathing	1.92	1.44	2.63	1.77	1.95	2.47	2.90	1.77	1.66	1.30	2.40	4.18	.70	5.17	2.16	1.04	1.69	1.79	1.94	1.24	1.07	3.61	1.27	1.56	1.71
Masonry	2.21	1.27	3.03	2.56	3.30	2.24	4.60	1.24	1.52	1.35	2.39	4.26	.95	5.27	1.14	1.02	1.10	4.06	1.79	2.11	.79	4.00	1.17	1.67	1.58
Painting & decorating	3.29	1.83	4.51	4.73	4.70	4.13	5.30	1.53	1.60	2.53	3.27	4.88	1.95	5.00	2.83	1.70	1.81	2.14	2.27	1.79	1.39	4.58	1.79	2.38	2.00
Pile driving—building operations	10.79	6.78	14.78	4.83	6.40	13.29	8.10	8.26	7.68	4.51	16.17	11.60	2.65	11.68	8.49	5.41	9.05	14.31	6.21	3.35	4.44	10.38	6.20	9.33	5.46
Plastering	2.31	1.41	3.16	2.17	1.95	3.51	4.40	1.18	1.69	1.15	2.56	4.18	.70	5.54	1.92	1.28	1.24	1.88	2.92	1.51	.78	3.61	1.25	1.52	2.57
Plumbing	1.60	1.20	2.19	1.88	2.30	2.37	3.30	1.45	1.64	1.23	2.47	2.14	.80	2.81	1.65	.94	1.24	2.34	1.38	1.19	.81	2.01	.98	1.80	1.21
Roofing	7.98	6.01	10.93	10.90	9.50	9.68	A	5.95	5.41	5.94	12.55	11.37	1.95	14.05	6.06	3.84	3.58	7.23	5.93	4.92	3.83	A	3.57	8.28	5.22
Sheet metal work	2.31	1.73	3.16	2.14	2.50	3.28	5.20	2.07	1.45	1.81	3.15	4.69	1.95	6.80	2.20	1.26	2.02	2.60	2.23	1.54	1.27	4.10	1.49	2.41	1.96
Steel erection—door & sash	2.68	2.02	3.67	2.40	3.50	3.45	3.60	2.49	2.86	1.77	4.42	A	3.65	7.28	2.78	1.45	2.37	2.58	1.92	1.74	1.40	A	1.81	3.26	1.60
Steel erection—interior ornament	2.68	2.02	3.67	2.49	3.50	3.45	3.60	2.49	2.86	1.77	4.42	A	3.65	7.28	2.78	1.45	2.37	2.58	1.92	1.74	1.40	A	1.81	3.26	1.60
Steel erection—structural	16.73	9.28	22.92	11.42	13.20	18.99	14.50	9.86	10.14	6.30	12.82	18.50	3.65	38.94	18.33	7.00	6.80	11.32	A	9.37	5.71	17.35	8.61	8.44	A
Steel erection—dwelling—2 stories	7.39	5.24	10.12	6.19	5.80	9.53	5.00	6.47	7.28	3.58	11.94	8.89	3.65	17.57	8.34	3.15	5.81	8.87	6.32	4.59	3.54	8.48	4.76	4.62	5.56
Steel erection—general	11.49	7.97	15.74	9.79	8.30	16.01	12.90	8.41	8.21	4.40	10.57	A	3.65	29.35	9.56	4.24	5.25	8.87	7.38	6.71	3.03	11.55	4.15	7.97	6.49
Tile work—interior	1.14	.94	1.56	1.17	1.55	1.63	2.70	.91	1.39	.83	2.00	1.55	.70	3.19	1.32	.73	1.01	1.35	2.13	.86	.63	1.46	.81	1.00	1.87
Timekeepers and watchmen	2.68	2.08	3.67	2.54	A	3.49	4.60	2.50	2.96	1.88	3.47	3.99	F	7.40	2.61	1.56	2.43	F	2.53	1.81	1.56	4.18	1.79	3.20	2.23
Waterproofing—brush	3.29	1.83	4.51	4.73	4.70	4.13	5.30	1.53	1.60	2.53	3.27	4.88	.70	5.00	2.83	1.70	1.81	2.14	2.27	1.79	1.39	4.58	1.79	2.38	2.00
Waterproofing—trowel—interior	2.31	1.41	3.16	2.17	1.95	3.51	4.40	1.18	1.69	1.15	2.56	4.18	.70	5.54	1.92	1.28	1.24	1.88	2.92	1.51	.78	3.61	1.25	1.52	2.57
Waterproofing—trowel—exterior	2.21	1.27	3.03	2.56	3.30	2.24	4.60	1.24	1.52	1.35	2.39	4.26	.70	5.27	1.14	1.02	1.10	4.06	1.79	2.11	.79	4.00	1.17	1.67	1.58
Waterproofing—pressure gun	3.95	2.81	5.41	4.14	4.90	3.15	6.00	2.68	3.04	1.80	7.41	4.89	.70	9.51	3.25	1.99	2.28	4.06	2.77	2.35	1.95	4.59	1.81	2.72	2.44
Wrecking	16.57	12.10	22.70	14.71	20.70	20.42	A	12.14	12.24	6.09	17.48	23.63	9.50	38.12	17.95	8.20	10.93	13.00	23.82	10.29	5.79	22.16	9.49	12.89	20.96

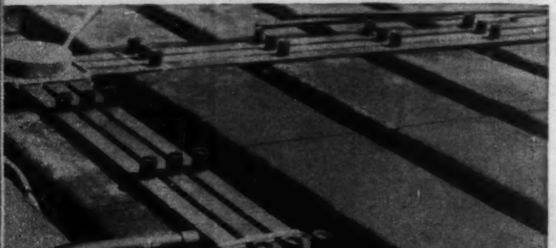
*A Specially rated—refer to company. *B Rate varies with type of work. *C Includes form work. *D Pile driving, caisson and dam work separately rated. *E Special occupational disease loadings apply. *F Assigned to main classification. *G Subscription to State Fund mandatory—Nevada, Industrial Comm., Carson City, Nev.; Workmen's Compensation Bureau, Bismark, N. Dak.; The Industrial Commission of Ohio, Columbus, Ohio; State Compensation Commission, Charleston, W. Va.; Workmen's Compensation Dept., State Treasurer's Office, Cheyenne, Wyo.



Ceco-Meyer Steelform Construction saves steel, concrete, lumber and labor. The removable steelforms are quickly installed on simple open wood centering. Cost is reduced because the same lumber steelforms are re-used from floor to floor.


THICKNESS (usually 2½", 3" or 3½")
DISTRIBUTOR DUCTS
THICKNESS + 2"
STEELFORM OF TYPICAL DEPTH
STEELFORM 2" SHALLOWER THAN TYPICAL
REINFORCED CONCRETE

Cross-section through distributor ducts, showing the strength and simplicity of R/C Duct Floors made with Ceco-Meyer Reinforced Concrete Joist Construction.



Here's a partially completed 3-duct system. The electrical ducts are installed on top of Ceco-Meyer Removable Steelforms. Concrete is poured over and around ducts. Result is monolithic floor system—no fill needed.

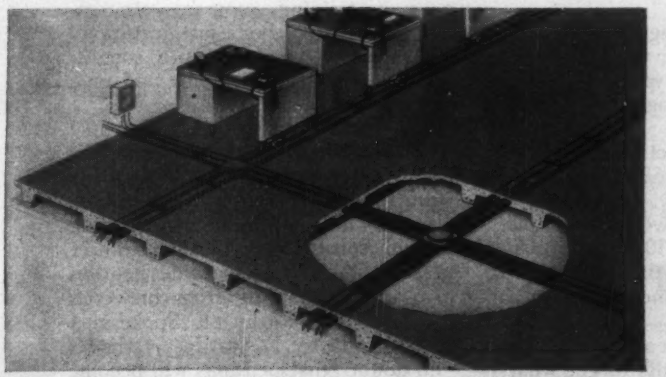
Electrified floors in reinforced concrete

...outlets every **2** feet along ducts...

Yet the cost is 19% less...due to Ceco-Meyer Steelform Construction

One of the prime necessities in buildings today is plenty of conveniently placed electrical outlets. And the most economical way to assure electrical flexibility is to build with reinforced concrete—with R/C Duct Floors provided by Ceco-Meyer Reinforced Concrete Joist Construction. That's how the problem was solved at the National Education Association Building, Washington, D.C., where R/C Duct Floors actually cost 60¢ per square foot less than cellular steel flooring, or a saving of 19%. In R/C Duct Floor construction, a network of steel electrical ducts is buried in the structural slab. Capped outlets every 2 feet along the ducts provide handy electrical connections for the telephones and business machines now in use. When expansion or re-arrangement is necessary, electrical equipment can be moved anywhere without costly rewiring or tearing up floors to provide electrical outlets. On your next building project, consult Ceco Engineers. They can save you money with R/C Duct construction—at the same time you get rigid Reinforced Concrete floors.

World Center Building, Washington, D.C.—another structure with the economical electrical flexibility of R/C Duct Floors provided by Ceco-Meyer Reinforced Concrete Joist Construction. Architect: Robert O. Scholz / Structural Engineer: Otto Vogt / Contractor: R.O. Scholz, Inc.



Standard electrical distribution ducts are buried in structural concrete. No additional fill or expensive topping is needed. Electrical connections are provided as close as every 2 feet along the ducts.

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ENR

Construction Labor Costs are Headed Up

The trend toward bigger wages—and more pressure on construction management and cost controls—is here to stay.

That's the view of most construction industry members, both management and labor, questioned by ENR. A highly competitive labor situation in a thriving industry and an expanding economy, they say, can promise little else.

Basic wage increases in the building trades this year have been hitting an average of 12.5 cents an hour. Two-year contracts in many areas have already set a similar pace for next year.

Apprentice training programs, with 92,000 construction workers now enrolled, still fail to meet the skilled labor needs of the industry. AFL-CIO merger plans and the "guaranteed annual wage" are crystallizing and emphasizing the "rights", the hopes and the ambitions of organized labor as a whole. And when the new federation is formed in December, organized labor will inherit a powerful and effective instrument for achieving its goals.

Coupled with the nation's general economic prosperity and that of the construction industry in particular, these factors add up to an upward surge that's strong. A few expect wages to level off in a year or two and some say "its anybody's guess"—but most see no turn in the tide unless and until an economic recession sets in.

Most of these factors were present during the collective bargaining sessions of 1955. Although the results are as heterogeneous as the industry itself, a number of significant trends occurred. Among them are these: greater stabilization of labor costs; more interest in basic rates than in fringe benefits; increasing interest in paid holidays, vacation pay and pension funds; and more understanding and cooperation on the part of both labor and management.

• **Stabilization**—Throughout the year, unions and contractors have tried in several ways to free collective bargaining—and resulting wage rates—from some of its "hit-or-miss" and "free-for-all" characteristics. Reasonable constancy, relative uniformity and fewer area differentials have been the major goals.

Widespread use of two-year contracts—now more numerous than ever before—mark the most significant trend in this direction. Out of a group of 227 contracts negotiated this year in 78 areas across the country and selected at random, half will run for two years, three for three years, two for four years, and the balance for one year. Except in isolated cases, the two-year contracts contain no reopening clause for wages.

Other efforts to stabilize labor costs were moderately successful. For example:

- Wider area bargaining was achieved in many sections of the country, and a greater expansion is predicted for the future as existing area differentials are gradually reduced. Areas in which state-wide progress was made with some of the trades included Arizona, Wisconsin and New York. Local areas were also extended for other trades in Detroit, St. Louis and New York City.
- Further standardization of wage rates and working conditions was attempted in various areas. Some success was achieved in the 29-county area in and around Philadelphia, and efforts are now underway in Baltimore to institute the "Chicago plan."
- Significant strides in across-the-board bargaining were widespread. Joint negotiations on a more inclusive scale than ever before were conducted in Akron, Cincinnati, St. Louis and Arizona.
- Uniform run-out dates for union contracts were sought in many areas and achieved in some. Although the preference in Milwaukee, Cincinnati, St. Louis and New York was for uniform May or June terminations, rollbacks to March and April were sought in sections of Colorado and New Jersey in order to pull negotiations away from peak construction periods.

The effect of these developments on the general level of wages remains to be seen. But, meanwhile, they are expected to inject more orderliness and uniformity into collective bargaining and to afford contractors a more stable and a more widely effective rate structure with which to plan and operate.

• **Basic rates and fringe benefits**—Basic rates have paced far ahead of fringe benefits during the year and most of the 1955 boost in wages falls into this category.

In one-year contracts, basic increases ranged from 2.5 to 62.5 cents, struck a 12-cent average, and most commonly hit 10 cents. In two-year contracts, they ran from 8 to 50 cents, averaged 23 cents (13 cents the first year, 10 cents the second), and struck no particular pattern.

Reasons for the trend are ill-defined. Some say "labor wants to get what it can while the getting's good." Others feel that contractors, especially the smaller ones, have grown tired of the complexity fringe benefits entail and that widespread criticism of fund management has had a dampening effect.

Home building rates have tended to keep pace with commercial rates, although home builders, as in Cleveland, tried to have their plight and problems recognized. Some areas were able to retain existing differentials, but for many home builders nonunion labor remains the key to lower building costs.

Escalator clauses, particularly those based on the cost-of-living index, were generally discarded as a governor on rising labor costs. Some chapters of the AGC tried unsuccessfully to revive their use. Even Buffalo's industry-formula began to lose favor because resulting increases were falling too far behind the national pattern. Modified forms of escalation were used in some of the longer-than-two year contracts, and growing interest was shown in tying wages to national averages, as in the new four-year Arizona carpenter's contract.

• **Fringe benefits**-Destined for bigger things in the future, fringe benefits have played a minor role. Existing benefits were generally retained; health and welfare contributions were increased in many cases to eliminate existing differentials as between various crafts; and a few trades like the Denver carpenters took their old 7.5 cent welfare contribution in cash. A provision was inserted in many two-year contracts, granting unions an election to take subsequent increases in fringe benefits instead of cash.

Where the issue was active, emphasis was on paid vacations (predominately one week), paid holidays (6 or 8), liberalized travel and subsistence allowances, and pension funds. Contribution to apprentice and journeyman training programs—strategically tied in to labor's justification of higher wages—were frequently sought, particularly in the plumbing and pipe fitting trades.

Looking to the future, some feel that pensions will be construction labor's next big demand. The feeling's strongest in the northwest, where teamsters have talked about extending to the construction industry in 11 western states the area-wide pension plan won last spring from breweries in the Pacific Northwest. Spokesmen for the industry in Seattle say there's "no doubt" that pensions will become the next big issue there. Health and welfare plans are expected to be a

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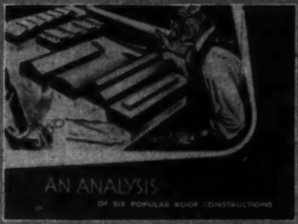

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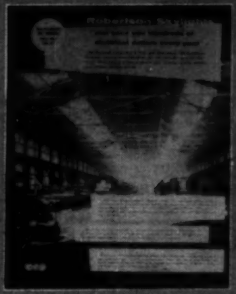

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. . . Construction Labor Costs Headed Up

source of perennial interest until workmen's compensation benefits are further liberalized and government sponsored sickness insurance programs become more universal. And some spokesmen predict that when labor can no longer push for big wage gains of the past, fringe benefits will again be on the ascendency as labor seeks to obtain the most for its money.

In detail, for 58 cities, rates and benefits resulting from 1955 bargaining to date are shown in the accompanying roundup for 27 trades.

• **Work week**—There's been little indication that a shorter work week will become a significant factor in rising labor costs—at least in the near future. Most of the talk has been in other fields and in the higher eschelons of labor. A few building trades recently won "clean up" and "rest" periods, and the issue was raised with negative results by some crafts, particularly in California, but little interest has been shown at the local level in a shorter work week as such. Some report that the issue is only temporarily a "sleeping dog" and is among labor's next demands; others agree that a shorter week may well come ahead of rate rollbacks if unemployment should rise.

• **Other factors**—To date, neither the guaranteed annual wage nor the forthcoming AFL-CIO merger are reported to have made any significant contribution to the rise in construction labor costs.

But those who initially thought that a GAW could never be adapted to the construction industry are taking another look, and various groups have had the issue up for "serious" discussion. Some contractors say it has already made the building trades more "cocky" and feel that it contributed indirectly to this year's bigger demands. One east coast contractor predicts "it won't be long" before there's some form of GAW in the industry.

The pending merger is similarly viewed with mixed emotions. While some members of labor and management see no effect on construction labor costs, others say its effects "will be very much in evidence by 1957."

To one AFL official, the new federation means that labor "will be better able to see that the working men and women of America earn and are thus able to put into circulation a more fair share of the wealth they produce." And one contractor sums it up this way: "I'm certain the merger will bring more and more pressure on the construction industry in wages and in efforts to organize. Construction costs will go up and up."

Whether higher wages are justified will remain a controversial question, as long as there's room to argue the relative "rights" of labor and management. Current evaluations of construction labor's productivity and skill have only their lack of unanimity in common. But many do agree that today's higher wages are attracting to the construction industry men of a finer type and of greater capacity.

Few deny that the net result is a challenge to the ability and ingenuity of contractors, who are gearing themselves to greater efficiency. Many contend that the compelling need to cut labor costs requires "a contractor to go to machinery in today's market to stay in business." But as many more will deny it, pointing instead to the need of speeding up production, of easing the work of individuals, and of making up for lack of skills.

But regardless of the diversity of opinion as to whether labor costs are increasing the use of machinery and reducing the labor force, there is an evident and growing interest in simplification of designs; in tilt-up and lift-slab construction; in metal facing panels and other materials cheaper to install; in more powerful and productive types of machinery with automatic controls and greater maneuverability; and in trowel and plastering machines, pallets, hoists, conveyors and power buggies, to name a few.

Out of it all has emerged what contractors in several areas consider the most significant development of all in collective bargaining—more sincerity, understanding and cooperation on the part of both labor and management. Although labor in many instances was considered slower in settling, fewer strikes were reported this year.

But regardless of the order in which these various forces, factors and trends are tabulated and added, the sum is the same. In the words of one contractor, the result is this: "An increasingly high priced labor market can be expected."

For the wage rates to which these footnotes apply, see facing page

▲**NOTE:** Rates rounded to nearest cent *Same as craft doing work ‡7-hr day #6-hr day §Negotiating •1 Brush •2 Up to 2 tons; 2-5 tons $1.70 •3 Plus 7½¢ 10/6/55 •4 Brush. Spray $2.50 •5 Plus 5¢ 12/1/55 •6 over 1½ ton, not incl. 3 tons •7 per mo •8 Plus 10¢ 1/1/56 •9 Plus 5¢ 6/1/56 •10 Plus 7½¢ 10/1/55; 7½¢ 6/1/56 •11 eff 9/1/55 •12 Plus 7½¢ 10/1/55 in pension fund, if fund not established by that time this will go into workers pay check until established. June 1, 1956 another 5¢ increase plus 2½¢ more on pension, if adopted, if not then 7½¢ will be added to pay check •13 Plus 7¢ 6/1/56 •14 blade •15 Plus 8¢ 1/1/56; 8¢ 8/1/57 •16 Plus 2½¢ 12/1/55 •17 Res. Com'l $2.80; Industrial $2.95 •18 Plus 10¢ 12/1/55 •19 Dump. Crane $2.20; Heavy $2.30 •20 Plus 7½¢ 5/1/56 •21 Brush. Spray $2.90 •22 Plus 15¢ 7/1/56 •23 Plus 10¢ 7/1/56 •24 Plus 7½¢ 3/1/56 •25 Plus 10¢ 7/7/56 •26 Plus 8¢ 1/1/56 •27 Plus 5¢ 4/1/56; 5¢ 10/1/56 •28 Plus 7½¢ 4/1/56; 2½¢ 1/1/57 •29 Plus 5¢ 4/1/56 •30 Plus 4¢ 9/15/55 •31 Plus 3½¢ VF, 10/1/56 •32 This work done out of Birmingham •33 Plus 10¢ 1/1/56; 10¢ 7/1/56; 10¢ 1/1/57 •34 Plus 10¢ 1/1/56; 20¢ 7/1/56; 10¢ 1/1/57; 10¢ 7/1/57 •35 Plus 3% PF, 1/1/56 •36 Plus 10¢ 8/1/56 •37 Plus 10¢ 10/1/55 •38 Plus 25¢ 10/1/55; 12½¢ 7/1/56 •39 Plus 2½¢ 1/1/56 •40 Plus 10½¢ 1/1/56 •41 House. Steel $2.68 •42 Plus 7½¢ 11/1/55; 7½¢ 5/1/56; 7½¢ 11/1/56 •43 Plus 5¢ 11/1/55; 7½¢ 5/1/56 •44 Plus 14¢ 5/16/56; 10¢ 5/16/57 •45 Plus 7½¢ 1/1/56 •46 Includes 15¢ incr. eff 8/16/55; 15¢ to be added 8/16/56

▲**RANGES:** •A 1.30–1.45 •B 2.60–3.00 •C 2.05–2.60 •D 0.75–1.00 •E 0.80–1.00 •F 2.50–2.75 •G 2.53–2.97 •H 2.97–3.23 I 2.15–2.30 J 3.07–3.82 •K 1.42–1.68 •L 2.55–2.70 •M 3.25–3.40 •N 2.85–3.00

▲**BENEFITS:** •a Incl 10¢ WF •b Incl 5¢ WF •c Incl 7½¢ WF •d Incl 7¢ WF •e Incl 15¢ WF, 5¢ Advtg •f Incl 15¢ WF, 5¢ Promotion Fund •g Incl 12¢ WF •h Incl 6¢ WF •i Incl 10¢ WF, 5¢ PF, 2¢ Coordinator •j Incl 11¢ WF •k Incl 22½¢ WF •l Incl 20¢ WF •m Incl 24¢ WF •n Incl 22¢ WF •o Incl 10¢ PF •p Incl 1% PF •q Incl 16¢ WF •r Incl 9½¢ WF •s Incl 10¢ Ins., 5¢ PF •t Incl 3¢ Promotion Fund •u Incl 8¢ WF •v Plus 4% gross payroll •w Incl 10¢ H&WF, 5¢ Organization •x Incl 4% VF •y Incl 10¢ VF •z Incl 5¢ PF •aa Incl 6¢ PF, 6¢ VF •bb Incl 5¢ VF •cc Incl 6¢ VF •dd 1 wk paid vac •ee Incl 6% VF •ff Incl 12½¢ WF •gg Plus $2.25/wk WF •hh Incl 3¢ PF •ii Incl 2 3/4% WF •jj Incl 8½¢ WF •kk Incl 14¢ WF •ll Incl 5 3/4¢ WF •mm 6 PH •nn Incl 5% WF, 6 PH •oo Incl 4% WF, 20¢ PF •pp Incl 3% WF, 3% PF, 10¢ in lieu of PH •qq Incl 4% WF, 4% PF •rr Incl 5% WF, 3% PF •ss Incl 15¢ WF, 15¢ PF, 20¢ BF •tt Incl 5% W&PF, 4% VF, 1% NC, 1% Joint Industry Bd Assessment, 6 PH •uu Incl 3% WF, 5% PF •vv Incl 3% WF, 3% PF, 2% VF, 1% EF •ww Incl 5% WF, 3% BF •xx Incl 3% WF, 3% PF, 2% VF •yy Plus approx $5.30/wk W&PF •zz Incl 3% WF •aaa Incl 3% WF, 3% PF •bbb Incl 11¢ PF •ccc Incl 1% WF •ddd Incl 9¢ WF •eee Incl 10½¢ WF •fff Incl 17¢ WF •ggg Incl 10½¢ WF, 7½¢ PF •hhh Incl 15¢ WF •iii Incl 10¢ WF, 1½% PF •jjj Plus $6.50/mo per man WF •kkk Incl 11½¢ WF •lll Incl 10¢ WF, 15¢ PF •mmm Incl 18¢ WF •nnn Incl 7½¢ WF, 6½¢ VF •ooo Incl 7½¢ WF, 3% VF •ppp Incl 10¢ trust fund •qqq Incl 3½¢ WF •rrr Incl 36¢ WF •sss Incl 16½¢ WF •ttt Incl 21¢ WF •uuu Incl 4¢ Ins. Fund •vvv Incl 4% WF, 3% PF •www Incl 12% BF

▲**OVERTIME:** •a DT •b DT Sun •c DT except (DT Sat, Sun & Hol) carp, mas help, cement, elec, paint, roof, waterp, sheet met, oper engrs, tr dr •d DT all but lab, mas help, cement, paint, glaz, roof; (TH Sat. 1st 3–5 hrs work day, DT Sun) carp, elec, plumb, steamf, sheet met •e DT all but lab, mas help, tr dr •f DT brick, iron, stone mas, plast, mos & ter, tile, plumb, steamf, sheet met, weld •g DT brick, iron, stone mas, mos & ter, tile, plumb, steamf, sheet met •h DT all but (DT Sun & Hol) lab, mos & ter, tile, cement, paint, glaz, waterp •i DT except lab, paint, glaz, roof, waterp, tr dr •j DT all but (TH in excess 8 hr reg work day) elec, paint, tr dr; (TH 1st 2½ hrs) lab, mas help; (TH 4:30–7PM) cement; (DT Sat, Sun & Hol) glaz; (TH up to 12 Noon Sat) plumb; (TH before 8AM & after 4 PM, DT after midnight Sat to 6 AM Mon & Hol) steamf, welder; (TH Sat) sheet met; (TH 9th hr after reg day thereafter DT) shov oper •k DT all but lab, paint, tr oper, shov oper, tr dr •l DT all but lab, paint, tr dr (TH up to 4:30 PM) waterp •m DT all but lab, mos & ter, tile, cement, paint, glaz, roof, waterp, tr dr •n DT iron •o DT all but lab, mas help, mos & ter, tile, elec, paint, glaz, roof, waterp; (DT Sun) carp; (DT 4:30 PM Fri to 8 AM Mon) cement •p DT all but lab, cement, glaz, roof, waterp, sheet met, tr dr •q DT carp, brick, iron, stone mas, plast, mos & ter, lath, sheet met •r DT all but (DT Sun) lab, mas help; (DT Sat & Sun) mos & ter; (TH) cement, waterp, paint (old work), tr dr •s DT all but lab, mas help, mos & ter, tile, paint, tr dr; (DT Sat & Sun) cement •t DT except lab, paint •u DT except (DT Sat, Sun & Hol) mos & ter, tile, cement, elec, glaz, plumb; (DT Sun & Hol) lab, mas help, roof, waterp •v DT except lab, mas help, mos & ter, tile, paint, glaz, tr dr •w DT except (TH 6:AM Mon to 4:30 PM Fri) lab; (TH 12 Mid Mon to Fri) tile, paint; (TH 4:30 PM to 12 M Mon—Thurs) plumb, steamf; (DT Sat, Sun & Hol) roof, waterp •x DT except lab, mos & ter, tile, paint, glaz, roof, waterp, sheet met, oper engrs, tr dr; (TH 1st 3 hrs) cement •y DT carp •z DT all but (DT Sat, Sun & Hol) carp, lab, mas help, plast, mos & ter, tile, cement, lath, elec, paint, glaz, plumb, steamf, roof, waterp, sheet met, oper engrs; (TH Sat) tr dr •aa DT all but lab, mas help, cement, lath, paint, glaz, roof, waterp, sheet met, tr dr •bb DT all but (DT Sat, Sun) lab, mas help, mos & ter, tile, cement, tr dr •cc DT except (TH) elec •dd DT brick, iron, stone mas, plast, mos & ter, tile, cement, lath •ee DT except lab, mas help, mos & ter, tile, cement, elec, paint, glaz, plumb, steamf, roof, waterp, tr dr •ff DT brick, iron, stone mas, mos & ter, tile, lath, waterp •gg DT sheet met, weld, hoist engrs •hh DT except (TH) com lab hvy, cement, sheet met, oper engrs, tr dr •ii DT except (TH) tr dr •jj DT carp, brick, iron, stone mas, plast, mos & ter, tile, lath, sheet met, weld, oper engr •kk DT except (TH 1st 4 hrs) lab; (DT Hol) paint; (TH 1st 2 hrs) roof, waterp; (TH) tr dr •ll DT except cement; (TH 1st 2 hrs) glaz •mm DT all but lab, mas help, elec, sheet met, oper engrs, tr dr

Building Trades Wage Rates—August 1, 1955

Quoted in $/hr., 8-hr. day; time and one-half for overtime after 40 hr. except where noted

Compiled by ENR

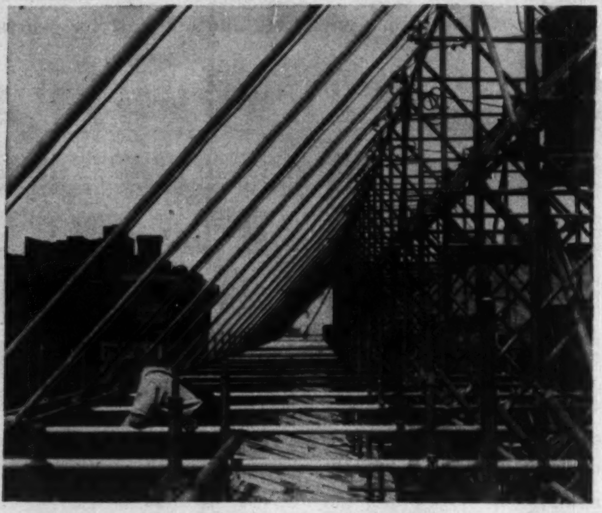
City and State	Car-penters	Brick-layers	Struct Irwkrs	Reinf Irwkrs	Labor Bldg	Labor, Hvy Const	Stone-masons	Mason's Helpers	Plasterers	Mosaic & Terrazzo	Tile Layers	Cement Finishers	Lathers	Electrns (Inside)	Painters	Glaziers	Plumbers	Steam-fitters	Roofers	Water-proofers	Sht Met Workers	Welders	Hoist Eng 1-Drum	Hoist Eng 2-Drum	Tract Op (30 hp+)	Shovel Operator	Truck Dr (1½T+)
Atlanta, Ga....c	2.60	[23]3.25	2.95	2.80	1.38	1.38	3.25	1.50	2.88	3.25	3.25	2.65	2.88	3.00	[1]2.50	2.35	[e]3.15	[e]3.15	1.85	1.85	2.73	•	2.35	2.70	2.43	2.95	[3]1.50
Austin, Tex....d	2.50	3.50	[3]2.93	[3]2.65	1.25	1.35	3.50	[A]1.30	3.18	3.00	3.00	2.50	3.18	3.00	[4]§2.25	2.25	2.93	2.93	1.65	1.65	§2.75	•	2.55	2.90	2.90	2.90	1.25
Baltimore, Md....e	2.75	[e]3.20	[c]3.33	[c]3.08	[c]1.68	[e]1.68	[e]3.28	[c]1.83	[c]3.08	[c]2.95	[c]2.83	[c]3.08	[c]3.08	3.08	[41c]2.60	[c]2.55	[c]3.08	[c]3.08	2.25	2.25	[c]3.08	•	[L]2.55	[M]3.25	[N]2.85	[M]3.25	[c]1.83
Billings, Mont....f	2.60	3.00	3.00	3.00	2.00	2.00	3.00	2.37	3.00	3.00	3.00	2.63	2.85	2.90	2.50	2.45	2.90	2.90	2.40	2.40	[b]2.65	[b]3.05	2.38	2.60	2.60	[B]2.60	2.09
Birmingham, Ala....g	[11]2.60	3.25	[c]2.93	[c]2.93	1.38	1.48	3.25	1.38	[11]2.82	2.90	2.90	[11]2.68	2.25	[c]3.08	2.60	2.45	[c]3.13	[c]3.13	[c]2.36	[c]2.36	[bc]2.88	•	2.32	2.60	2.46	2.60	[e]1.85
Bismark, N D....	2.20	3.00	2.70	2.60	1.50	1.50	3.00	1.70	2.75	....	3.00	2.25	1.75	2.35	2.05	2.05	2.37	2.37	2.00	2.00	2.25	•	2.00	2.15	2.00	2.25	1.50
Boise, Idaho....	2.50	3.10	3.00	2.75	1.95	1.95	3.10	2.35	2.90	3.10	....	2.60	2.76	2.70	2.50	[7]377.50	[8]2.90	[8]2.90	[9]2.35	....	2.55	3.00	2.25	2.35	2.55	2.60	[C]2.05
Boston, Mass....h	[e]2.93	[e]3.35	[c]3.48	[e]3.48	[d]2.22	[d]2.22	[e]3.35	[d]2.22	[e]3.45	3.25	3.25	[e]3.39	[f]3.45	[e]3.12	[e]2.70	[h]2.74	[i]3.22	[i]3.22	[e]2.98	[e]3.39	[j]3.11	[j]3.11	3.40	3.40	3.03	3.40	2.20
Buffalo....	3.11	3.45	[e]3.27	[c]3.27	2.36	2.36	3.45	....	3.37	3.13	3.13	3.09	3.30	[42]3.30	[ff]3.00	....	[ec]3.30	[18]3.23	3.06	....	3.23	....	3.26	3.26	....	....	....
Charleston, S C....	2.25	2.75	2.75	2.50	1.00	1.00	2.75	1.15	2.50	2.50	2.50	2.00	2.50	2.75	1.75	1.75	2.75	2.75	1.75	1.75	2.50	2.25	2.00	2.55	2.00	2.40	1.25
Charleston, W Va....i	2.93	3.40	[c]3.18	[c]3.18	[45]1.93	1.85	3.40	[45]2.08	3.00	3.05	3.05	2.90	2.90	3.00	[1]2.50	2.40	3.05	3.05	2.50	2.50	2.82	•	2.85	3.00	2.50	3.05	2.05
Chicago, Ill....j	[10a]3.30	[10c]3.55	[c]3.50	[11a]3.50	[10c]2.50	[10c]2.50	[10c]3.55	[10c]2.50	[§b]3.63	§3.30	[c]3.38	[12a]3.30	[h]3.63	[§l]3.53	[c]3.20	[e]3.52	[m]3.44	[m]3.44	[§e]3.45	[§e]3.45	[13ce]3.36	[m]3.44	[10b]3.15	[10b]3.15	[14b]2.90	[b]3.50	[11e]2.12
Cincinnati, Ohio....k	3.15	[5]3.40	[c]3.28	[c]3.11	2.20	2.10	[5]3.40	2.40	3.23	[16]3.18	[16]3.18	[5]2.95	3.18	§[p]3.28	[17]2.65	3.05	[c]3.29	[r]3.45	[18]2.85	[8]3.15	[8]3.15	•	2.93	3.18	2.93	3.18	[19]2.10
Cleveland, Ohio....l	3.40	[20c]3.45	[c]3.40	[c]3.40	2.65	2.65	[c]3.18	§2.63	[20]3.40	3.15	3.23	[11]3.40	3.40	3.43	[1e]3.23	[e]3.33	[20a]3.40	[20a]3.40	3.40	3.40	3.33	3.15	[20]3.28	[20]3.28	3.15	[20]3.40	[e]2.42
Columbus, Ohio....m	2.85	3.40	[c]3.18	[c]3.18	2.00	2.00	3.30	2.15	[c]3.03	2.75	2.75	2.85	[c]3.03	3.18	[21]2.60	2.48	3.15	[c]3.18	§2.75	§2.93	[c]3.00	[c]3.18	2.93	2.93	3.18	3.18	2.00
Concord, N H....n	2.38	3.25	3.20	3.20	2.00	2.00	3.25	2.00	3.25	3.25	3.25	3.25	3.25	2.40	1.80	2.00	2.45	2.45	2.00	....	2.00	....	2.85	2.85	2.40	2.85	....
Dallas, Tex....o	2.88	3.63	2.95	2.68	1.50	1.50	3.63	1.65	3.44	2.90	2.90	2.88	3.44	3.00	2.75	[22a]2.61	[u]3.19	[u]3.19	[22]2.25	2.25	3.00	2.95	2.95	2.95	2.63	2.63	1.50
Dayton, Ohio....p	2.95	3.47	[e]3.20	[c]3.03	2.13	2.10	3.47	....	3.12	3.20	3.20	2.77	3.15	3.34	2.82	2.70	3.25	3.25	2.95	2.73	2.95	[c]3.20	2.95	2.95	2.60	3.23	2.24
Denver, Colo....q	2.98	3.50	[c]2.93	[c]2.93	1.93	1.93	3.50	2.35	[c]3.38	3.20	[u]2.80	[24]2.90	3.38	[e]3.00	§2.85	[29]2.63	[w]3.20	[w]3.20	§2.85	§2.85	[29]3.02	•	2.66	2.83	2.66	2.83	2.05
Des Moines, Iowa....	2.90	3.65	3.00	3.00	2.15	2.15	3.65	2.25	3.00	3.00	3.00	2.93	2.98	3.20	2.63	2.45	3.29	3.29	2.40	....	3.00	•	2.80	3.00	3.00	3.00	2.25
Detroit, Mich....r	[az]3.32	[ay]3.58	[az]3.48	[aa]3.07	[abb]2.55	[c]2.55	[ay]3.58	[abb]2.55	[az]3.49	[u]3.31	[u]3.31	[aee]3.17	[e]3.58	[dee]3.62	[e]3.08	[dd]2.83	[d]3.40	[d]3.37	[ff]3.35	[e]3.11	[ew]3.47	•	[e]3.30	[e]3.30	[e]3.30	[e]3.30	[ee]2.35
Duluth, Minn....b	[c]2.77	3.15	3.05	2.80	[c]2.03	[c]2.13	3.15	[c]2.13	3.00	....	[bb]2.63	[c]2.51	2.88	[cyhh]3.11	[c]2.58	[c]2.40	2.88	2.88	[c]2.70	[c]2.51	[c]2.78	•	2.85	2.85	....	3.07	2.07
Fort Worth, Tex....s	2.75	3.69	2.95	2.68	1.25	1.25	3.69	1.50	3.38	2.88	2.88	2.63	3.38	3.13	2.63	§2.90	§2.90	§2.90	2.33	2.48	[c]3.00	2.95	2.73	3.00	3.00	3.00	1.75
Harrisburg, Pa....t	[c]2.98	3.25	[mmm]3.50	[mmm]3.25	[qqq]1.84	[qqq]1.84	3.25	1.95	[eee]2.91	2.88	2.88	[qqq]2.88	[eeq]2.91	3.00	2.25	[h]2.46	2.90	2.90	2.35	2.05	[e]2.85	•	[e]3.45	[e]3.45	[e]3.08	[qqq][e]3.70	1.99
Helena, Mont....	2.60	3.00	2.75	2.75	1.90	1.90	3.13	2.08	3.00	3.13	3.13	3.00	3.00	2.75	2.50	2.35	2.90	2.90	2.65	....	2.65	....	2.28	2.50	2.50	2.50	2.00
Houston, Tex....u	2.95	3.43	[c]3.08	[c]2.83	1.73	....	3.43	1.90	[eee]3.36	2.90	2.90	2.95	[eee]3.36	[hhh]3.28	2.63	2.63	3.10	[c]3.05	2.63	2.63	[c]3.20	....	2.65	3.15	3.15	3.15	1.93
Indianapolis....	3.10	3.45	[c]3.23	[c]3.23	2.15	[c]1.83	3.45	2.32	3.25	3.20	3.20	2.80	3.08	3.28	2.80	2.99	3.20	3.20	2.46	....	3.08	....	3.13	3.13	3.13	3.13	2.20
Jackson, Miss....	2.43	3.00	2.80	2.55	1.20	1.20	....	....	2.63	....	....	2.55	2.50	2.75	[1]2.25	....	2.96	....	1.90	1.90	2.65	....	2.35	2.35	2.35	2.60	1.55
Jacksonville, Fla....v	2.55	3.05	2.81	2.55	1.00	1.00	3.05	1.10	2.80	2.63	2.63	2.23	2.80	3.10	[1]2.33	2.37	3.10	3.10	2.30	2.30	§2.50	•	2.50	2.50	2.09	2.50	1.50
Kansas City, Mo....w	[27]2.85	3.63	[28]3.00	[28]2.85	2.11	2.13	3.25	2.16	[29]3.33	3.18	3.18	2.85	3.08	[ap]3.23	2.66	2.80	[c]3.23	[c]3.23	2.58	2.58	[c]3.14	•	[29]2.80	[29]3.05	[29]2.25	[29]3.05	[29]2.07
Los Angeles, Calif....x	[30a]2.96	3.60	[46c]3.33	[46c]3.08	[30c]2.24	[30c]2.24	3.60	[c]2.58	[11ff]3.75	[cc]3.18	[cc]3.18	[30a]2.89	[11ff]3.75	3.25	[‡ii]2.99	[ddc]2.78	[e]3.44	[e]3.44	[ii]2.94	[ii]2.94	[31jj]3.21	•	[e]2.79	[e]2.79	[e]2.87	[e]3.10	[31c]2.34
Louisville, Ky....a	3.00	3.40	3.05	3.05	2.00	2.00	3.40	2.25	3.21	2.82	2.82	3.00	3.00	3.05	2.65	2.50	3.18	3.18	2.20	2.20	2.80	•	3.00	3.00	....	3.00	2.26
Meridian, Miss....y	2.25	2.75	[32]....	[32]....	1.10	[D]0.75	3.00	[E]0.80	2.35	[F]2.50	[F]2.50	2.35	2.25	2.78	2.00	2.25	2.50	2.50	2.00	2.35	2.50	2.50	[32]....	[32]....	2.00	2.00	....
Milwaukee, Wis....	[d]3.06	[d]3.32	[d]3.02	[d]3.02	[d]2.30	....	[d]3.32	[d]2.41	[d]3.12	[kk]3.25	[kk]3.14	[d]2.82	[kk]3.19	[ll]3.06	[d]2.67	....	[d]3.12	[d]3.12	[u]2.70	[d]2.69	[d]2.92	[d]3.04	[d]2.92	[d]2.92	[d]3.08	[d]3.25	[ee]2.24
Minneapolis, Minn....z	2.90	3.33	3.07	3.07	2.15	2.15	3.33	[mm]2.47	[ef]3.13	2.83	[mm]2.78	[36]3.00	[ef]3.13	[puee]3.29	2.75	[mb]2.61	[c]3.08	[c]3.08	2.75	2.75	[c]2.98	•	2.85	2.85	[G]2.53	[H]2.97	[I]2.15
Nashville, Tenn....aa	2.43	3.15	2.75	2.60	1.20	1.60	3.15	1.35	2.75	2.93	2.93	2.25	2.88	2.85	[1]2.35	2.18	2.93	2.93	2.15	2.15	2.60	....	2.10	2.35	2.10	2.55	1.50
New Orleans, La....bb	2.60	3.18	[c]2.98	[c]2.67	1.48	1.48	3.18	1.43	2.80	2.76	2.76	2.55	[b]2.65	[c]3.10	2.28	2.50	[e]3.10	[e]3.10	[c]2.61	....	[c]2.78	[c]2.78	2.80	2.80	2.15	2.80	1.58
New York City....cc	[‡33nn]3.73	[‡oo]4.15	[34pp]4.08	[33qq]3.83	[33rr]2.59	[33rr]2.59	....	....	[§ss]4.35	[uu]3.56	[ee]3.73	[‡33qq]3.73	[‡33qq]3.73	[ll]3.66	[§ttt]3.29	[‡33uu]3.83	[www]4.09	[‡33vv]3.98	[33ww]3.83	....	[‡33xx]3.94	....	[33nn]3.99	[33nn]3.99	[33nn]3.33	[33nn]4.25	[vv]2.12
Newark, N J....a	[‡ss]3.61	[‡aa]3.86	[aaa]3.98	....	‡2.80	....	....	....	[‡ss]3.86	....	....	[‡ss]3.86	[‡s]3.60	[pss]3.80	[‡abbb]3.71	....	[aaa]3.71	[aaa]3.71	[‡ff]3.58	....	[‡aaa]3.60	....	....	....	....	....	....
Ogden, Utah....	2.60	3.13	[c]2.88	[c]2.88	1.88	1.88	3.13	2.30	3.13	2.73	2.73	2.60	3.00	[v]2.91	[ddd]2.59	2.22	[11eee]3.01	[eee]2.96	2.50	2.50	[ff]2.73	....	2.43	2.65	2.60	2.75	1.95
Oklahoma City....dd	2.73	3.50	2.80	2.80	1.70	1.00	3.50	1.85	3.30	2.75	2.75	2.75	3.30	3.13	2.45	2.36	3.05	3.05	2.40	2.40	2.90	....	2.45	2.45	2.23	2.50	1.85
Omaha, Nebr....ee	2.75	3.23	2.90	2.90	1.90	1.90	3.23	1.90	3.10	2.85	2.85	2.70	2.95	3.15	2.40	2.48	[c]3.13	[c]3.13	2.25	2.25	2.75	2.90	2.45	2.45	2.90	2.90	1.90
Philadelphia....a	3.30	[‡fff]3.92	[eee]3.73	[eee]3.38	2.03	2.33	3.35	2.03	[hhh]3.65	§3.33	[ff]3.38	3.30	[ff]3.50	[iii]3.81	[1e]2.80	[jjj]3.00	[kkk]3.62	[kkk]3.62	[37a]3.15	[37a]3.15	[lll]3.61	•	[aJ]3.07	[aJ]3.07	[aJ]3.07	[aJ]3.07	2.33
Phoenix, Ariz....ff	2.85	§3.50	[c]3.18	[c]2.93	2.08	2.45	§3.50	2.45	3.30	§3.50	3.40	2.83	3.30	§3.30	[e]2.75	2.40	[e]3.05	[e]3.05	2.58	§3.50	[ii]3.09	2.85	2.70	2.85	2.85	3.03	2.18
Pittsburgh, Pa....gg	[c]3.28	[c]3.63	[c]3.35	[c]3.35	[c]2.18	[e]2.08	[c]3.20	[c]2.58	[c]3.48	[c]3.39	[c]3.28	[c]3.28	[c]3.48	3.50	[e]2.95	3.00	[c]3.45	[c]3.43	[c]3.15	[c]3.03	[c]3.33	[c]3.33	[c]3.43	[c]3.43	[c]3.43	[c]3.43	[c]2.20
Portland, Ore....hh	2.75	[e]3.50	[e]3.07	[e]2.87	[e]2.23	[e]2.23	[e]3.50	2.60	[e]3.25	2.90	3.05	2.80	[e]3.15	[e]3.05	[c]2.63	[e]2.73	[v]3.15	3.05	[c]2.83	[c]2.83	[nnn]2.99	•	[e]2.58	[e]2.88	....	....	[c]2.23
Providence, R I....ii	3.63	3.23	3.15	3.15	1.98	1.98	3.15	2.83	3.20	2.88	2.88	2.83	‡3.15	2.75	2.36	2.63	2.90	3.00	2.60	3.00	2.80	2.80	3.40	3.40	....	....	2.07
St Louis, Mo....a	[c]3.23	[eee]3.63	[c]3.23	[c]3.23	[c]2.28	[c]2.28	[eee]3.63	[c]2.73	[c]3.50	3.30	§[c]3.08	[§ppp]3.25	§[c]3.25	[pus]3.60	[1c]3.03	[e]3.35	[l]3.50	3.50	[b]3.10	[b]3.10	[kk]3.50	•	2.68	3.23	3.23	3.23	[e]2.88
St Paul, Minn....z	2.90	3.33	3.07	3.07	2.15	2.15	3.33	[mm]2.47	[ef]3.28	§2.73	[mm]2.78	3.00	[ef]3.13	[puee]3.29	2.75	[b]2.61	[c]3.08	[e]3.08	2.75	2.75	[c]2.98	•	2.85	2.85	[G]2.53	[H]2.97	[I]2.15
Salt Lake City....	2.60	3.13	[c]2.88	[c]2.88	1.88	1.88	3.13	2.30	3.13	2.63	2.63	2.60	3.13	2.88	2.59	2.35	2.96	2.96	2.50	2.50	2.73	3.20	2.43	2.65	2.60	2.75	1.93
San Antonio Tex....jj	2.65	3.25	2.88	2.88	1.30	1.30	3.25	[K]1.42	3.18	2.25	2.25	2.50	3.18	3.00	[1]2.38	2.38	2.90	2.90	1.80	1.80	[30]2.75	2.25	2.30	2.65	2.30	2.65	....
San Diego, Calif....x	[e]2.94	3.50	[c]3.18	[c]2.93	[c]2.24	[c]2.24	3.50	[c]2.58	[e]3.60	3.13	3.13	[e]2.89	[e]3.60	[e]3.25	[‡u]2.90	[c]2.78	[e]3.44	[e]3.44	3.00	[e]3.35	[ii]3.19	[e]2.95	[e]2.79	[e]2.79	[e]2.87	[e]3.10	[c]2.34
San Francisco....kk	[e]3.16	[‡e]3.75	[e]3.35	[fc]2.93	[e]2.28	[e]2.28	[‡e]3.75	....	[‡e][e]3.66	3.08	[c]3.18	[e]2.95	[c]3.51	[l]3.35	[‡ii]3.01	[c]2.83	[rrr]3.56	[rrr]3.56	[hhh]2.90	[hhh]2.90	[sss]3.24	[c]3.33	[e]2.96	[e]3.02	[e]3.07	3.23[e]	[C]2.38
Seattle, Wash....ll	[e]2.76	[e]3.50	[ao]3.07	[e]2.87	[e]2.35	[e]2.35	[e]3.50	[e]2.65	[e]3.25	[e]3.10	[e]3.15	2.72	[e]3.15	[§c cc]3.14	[c]2.71	[39c]2.57	[sss]3.31	[sss]3.31	2.75	2.75	[kk]3.13	[c]3.20	[e]3.00	[e]3.00	[e]2.95	[e]3.30	[48c]2.60
Toledo, Ohio....	[42d]3.25	[43d]3.46	[43d]3.35	[43d]3.22	[43d]2.47	[43d]2.47	[43d]3.46	[43d]2.60	[43d]3.35	[43d]3.46	[43d]3.46	[43d]3.35	[43d]3.35	[43d]3.35	[1 43d]2.97	2.70	[43d]3.35	[43d]3.35	[43d]3.15	[43d]3.15	[43d]3.15	[43d]3.35	[43mm]3.14	[43mm]3.14	[43mm]3.00	[43mm]3.28	[44ggmm]2.17
Topeka, Kans....	2.60	3.40	3.00	2.85	....	....	3.25	....	3.00	3.25	2.75	2.76	2.63	3.00	[1]2.50	2.40	3.00	3.60	2.30	2.30	2.71	....	2.35	2.75	....	....	....
Trenton, N J....a	3.28	[ff]3.48	[eee]3.93	[eee]3.93	2.25	....	[ff]3.48	....	[ff]3.48	[ff]3.48	[ff]3.48	[ff]3.48	3.15	[ap]3.76	2.73	§2.75	[ao]3.60	[ao]3.60	[ao]3.40	[ao]3.40	[ao]3.65	[e]3.60	[e]3.85	[e]3.85	[e]4.00	[e]4.00	2.24
Tulsa, Okla....mm	2.78	3.50	2.82	2.82	1.75	1.00	3.50	1.90	3.25	2.90	2.90	2.93	3.00	3.13	2.70	2.50	3.07	3.07	2.40	2.40	2.95	....	2.45	2.45	2.18	2.45	2.10

For footnotes, see facing page. These cover variations from the 8-hour day, time-and-a-half for overtime after 40 hours and the amounts included in these rates that are paid in the form of fringe benefits

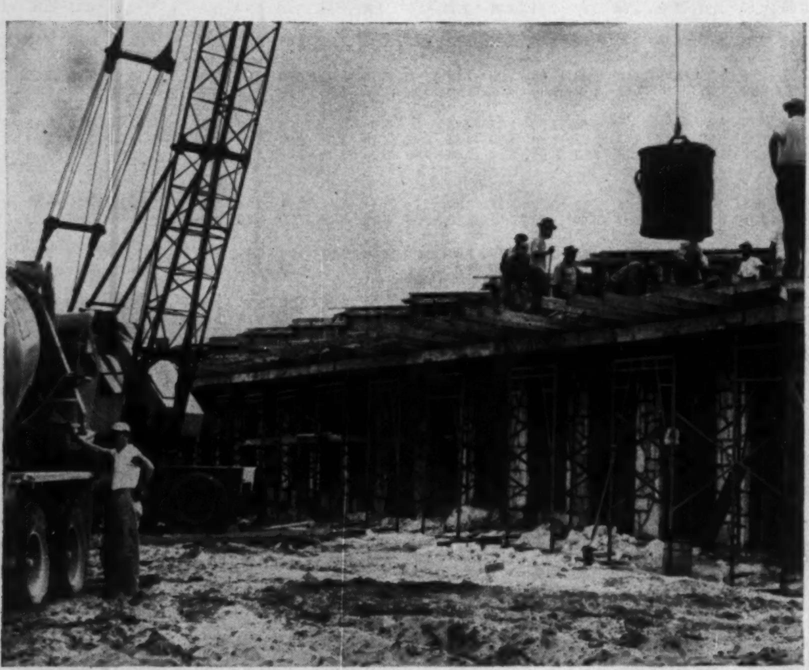
(Advertisement)

Scaffolding Methods . . . by Patent Scaffolding Co.

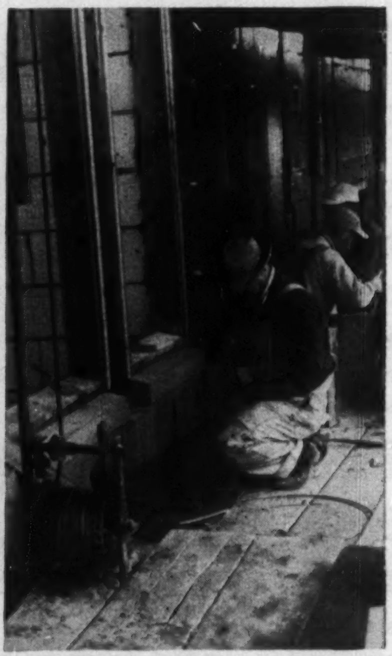
WITHIN EASY REACH—Separate 20"-wide platform, laid on sidewall brackets attached to "Trouble Saver"® Sectional Steel Scaffold, keeps materials easy to reach and men at most convenient working level. General contractor Damon G. Douglas uses this equipment for new elevator shaft at Hyatt Roller Bearing plant in Harrison, N. J.



OVER AND OUT—To remove cornice stones on an 18-story New York City building without disturbing a 6-ft. parapet wall, J. H. Taylor Construction Co. uses "TubeLox"® tube and coupler Scaffolding and cantilevered it 6 ft. beyond the wall. Steel cables, supporting a hanging, two-level "TubeLox" Scaffold below the cornice, run up over the framework and are anchored to the roof.



CONCRETE SHORING—Forms for the entire roof and all girders on the Northwest Dade Junior High School, Miami, are shored with 5'-wide "Trouble Saver" end frames, varying in height from 3' to 6'6". U-heads and extension legs in frame legs speed the installation of stringers. Thompson-Polizzi Construction Co., Miami, is the general contractor on this project. "Trouble Saver" Shoring, in addition to cutting shoring costs, provides a ready-made scaffold for stripping of forms or removing pans.



SEATTLE STONE—Four-story addition to the Bon Marche building in Seattle is faced with local cast stone by Bennett Campbell, Inc., general contractor. 88 6'6"-wide "Gold Medal"® Suspended Machines are used to scaffold two sides at a time.

To help you with your scaffolding and concrete shoring methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that sells and rents "Gold Medal" Scaffolds.

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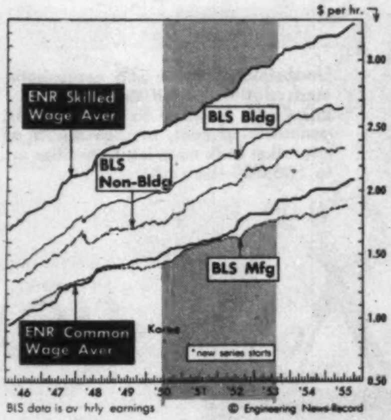

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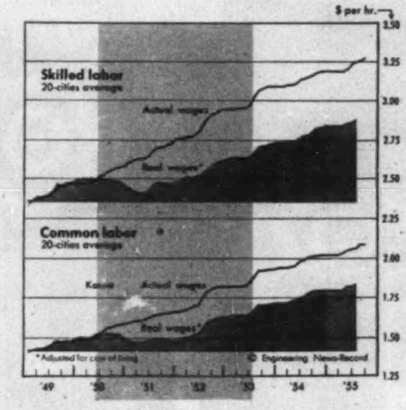


*Adjusted for cost of living © Engineering News-Record

Construction Wages—ENR 20-Cities Averages

SKILLED LABOR, dollars per hour
(Bricklayer, carpenter, ironworker average)

	1926	1932	1939	1945	1946	1949	1950	1953	1954	1955
J	1.24	1.15	1.43	1.64	1.70	2.35	2.46	2.94	3.09	3.19
F	1.24	1.11	1.43	1.64	1.73	2.35	2.47	2.95	3.09	3.19
M	1.24	1.11	1.43	1.64	1.74	2.38	2.47	2.95	3.10	3.19
A	1.25	.95	1.44	1.65	1.76	2.38	2.48	2.95	3.10	3.19
M	1.26	.96	1.44	1.65	1.77	2.38	2.48	2.96	3.11	3.21
J	1.27	.99	1.44	1.66	1.80	2.39	2.52	2.98	3.13	3.23
J	1.27	1.00	1.44	1.66	1.82	2.41	2.52	3.02	3.14	3.25
A	1.28	.98	1.44	1.67	1.83	2.44	2.54	3.06	3.15	3.26
S	1.28	.99	1.44	1.67	1.84	2.45	2.55	3.07	3.17	...
O	1.29	.98	1.44	1.67	1.85	2.46	2.56	3.08	3.18	...
N	1.29	.97	1.46	1.68	1.86	2.46	2.57	3.08	3.18	...
D	1.29	.98	1.46	1.68	1.87	2.46	2.58	3.08	3.19	...
Av	**1.27**	**1.02**	**1.44**	**1.66**	**1.80**	**2.41**	**2.52**	**3.01**	**3.14**	...

COMMON LABOR, dollars per hour
(Building and heavy construction average)

	1926	1932	1939	1945	1946	1949	1950	1953	1954	1955
J	.54	.45	.68	.89	.95	1.42	1.49	1.82	1.95	2.02
F	.54	.45	.68	.89	.97	1.42	1.49	1.82	1.95	2.02
M	.54	.44	.68	.89	.99	1.42	1.49	1.82	1.95	2.02
A	.54	.41	.68	.90	1.00	1.43	1.49	1.83	1.95	2.03
M	.55	[illegible]	.68	.91	1.02	1.43	1.51	1.83	1.97	2.05
J	.55	[illegible]	.68	.92	1.03	1.44	1.53	1.86	1.98	2.06
J	.55	.41	.68	.92	1.06	1.47	1.54	1.88	2.00	2.07
A	.56	.42	.69	.92	1.07	1.47	1.56	1.93	2.01	2.09
S	.56	.43	.69	.92	1.07	1.48	1.56	1.93	2.01	...
O	.55	.43	.69	.92	1.07	1.48	1.57	1.93	2.02	...
N	.56	.43	.69	.92	1.08	1.48	1.58	1.93	2.02	...
D	.56	.43	.69	.94	1.09	1.48	1.58	1.93	2.02	...
Av	**.55**	**.43**	**.68**	**.91**	**1.03**	**1.45**	**1.53**	**1.88**	**1.98**	...

Averages include fringe benefits—see 1955 wage table by trades for each of 20 cities for nature and extent of these—welfare fund, pension fund and others.

Skilled and Common Wages in 20 Cities

ENR 20-Cities, U. S.	Hrs per day	Bricklayers 1954 Low	Aver	High	Carpenters 1954 Low	Aver	High	Structural Ironworkers 1954 Low	Aver	High	Common labor (Av bldg & heavy constr) 1954 Low	Aver	High
Atlanta	8	$3.10	$3.10	$3.10	$2.50	$2.50	$2.50	$2.75	$2.783	$2.85	$1.28	$1.297	$1.33
Baltimore	8	3.20[a]	3.20	3.20[a]	2.75	2.75	2.75	3.275[d]	3.279	3.325[d]	1.675[d]	1.675	1.675[d]
Birmingham	8	3.15	3.175	3.25	2.40	2.425	2.50	2.825[c]	2.85	2.925[c]	1.35	1.369	1.425
Boston	8	3.185[b]	3.185	3.185[b]	2.75	2.75	2.75	3.15[d]	3.181	3.275[d]	1.99[p]	2.09	2.14[q]
Chicago	8	3.40[c]	3.475	3.55[c]	3.15[b]	3.225	3.30[b]	3.20[m]	3.289	3.34[m]	2.35[c]	2.435	2.50[e]
Cincinnati	8	3.225	3.275	3.325	2.875	2.975	3.075	2.99[e]	3.038	3.19[k]	2.02	2.045	2.07
Cleveland	8	3.25[d]	3.302	3.375[d]	3.20	3.252	3.325	3.20[d]	3.252	3.325[d]	2.45	2.502	2.575
Dallas	8	3.50	3.50	3.50	2.625	2.667	2.75	2.75	2.823	2.875	1.40	1.421	1.45
Denver	8	3.50	3.50	3.50	2.775	2.806	2.85	2.75	2.783	2.85	1.80	1.831	1.875
Detroit	8	3.33[e]	3.40	3.45[b,f]	3.08[e]	3.147	3.21[e]	3.23[e]	3.28	3.33[e]	2.28[r]	2.371	2.45[b]
Kansas City	8	3.625	3.625	3.625	2.675	2.725	2.75	2.805	2.868	2.90	1.98	2.025	2.042
Los Angeles	8	3.285[e]	3.323	3.40	2.70	2.742	2.825	2.925[c]	3.002	3.175[c]	2.05	2.092	2.15
Minneapolis	8	3.125	3.183	3.225	2.70	2.758	2.80	2.82	2.883	2.97	1.95	2.008	2.05
New Orleans	8	3.05	3.079	3.10	2.42	2.458	2.52	2.80[m]	2.838	2.90[m]	1.375	1.404	1.425
New York	7	3.87[h]	4.033	4.15[h]	3.57[l]	3.57	3.57[l]	3.975[n]	3.975	3.975[n]	2.415[j]	2.415	2.415[j]
Philadelphia	8	3.62[i]	3.82	3.92[i]	3.10	3.167	3.20	3.51[o]	3.55	3.63[o]	2.025	2.075	2.10
Pittsburgh	8	3.475[c]	3.579	3.625[c]	3.20[c]	3.20	3.20[c]	3.225[c]	3.225	3.225[c]	2.04[c]	2.04	2.04[c]
St. Louis	8	3.62[c,k]	3.62	3.62[c,k]	2.975[c]	3.075	3.125[c]	3.10[c]	3.10	3.10[c]	2.095[c]	2.148	2.175[c]
San Francisco	8	3.475[c]	3.533	3.65[b]	2.905	2.943	2.98	3.075[c]	3.10	3.175[c]	2.075[c]	2.117	2.15[c]
Seattle	8	3.30	3.383	3.40[a]	2.75[a]	2.75	2.75[a]	2.78	2.922	2.95[a]	2.30	2.317	2.35
Montreal, Can.	8	2.00	2.00	2.00	1.80	1.80	1.80	1.90	1.90	1.90	1.25	1.25	1.25

[a] Incl 10¢ H&WF [b] Incl 10¢ WF [c] Incl 7½¢ WF [d] Incl 7½¢ H&WF [e] Incl 8¢ WF [f] Incl 10¢ VF [g] Incl 11¢ H&WF [h] Incl 3% WF, 20¢ PF [i] Incl 12¢ WF, 15¢ PF [j] Incl 17¢ WF [k] Incl 3% VF [l] Incl 5% WF [m] Incl 5¢ WF [n] Incl 3% WF, 3% PF [o] Incl 10½¢ WF, 7½¢ PF [p] Incl 6¢ H&WF [q] Incl 7¢ H&WF [r] Incl 8¢ WF

Wage Rates Including Benefits—New York City

Dollars per hour

Year	Carpenters	Bricklayers	Masons' Laborers	Common Laborers	Structural Ironwkrs
1874...	$0.23 (10 hrs.)	$0.43 (8 hrs.)	$0.18 (8 hrs.)	$0.14 (10 hrs.)	....
1890...	0.43 (8 hrs.)	0.47 (8 hrs.)	0.28 (8 hrs.)	0.14 (9 hrs.)	....
1907...	0.63	0.70	0.38	0.22 (8 hrs.)	$0.60 (8 hrs.)
1913...	0.63	0.70	0.38	0.23	0.63
1930...	1.65	1.93	1.03	1.03	1.93
1932...	1.33 (7 hrs.)	1.47 (7 hrs.)	1.00 (7 hrs.)	0.65	1.68
1938...	1.75	1.89	1.00	0.91	1.93
1939...	1.75	1.89	1.03	0.91	1.93
1942...	1.85	2.00	1.03	0.95	2.00
1946...	2.10	2.25	1.23	1.20	2.25
1947...	2.47	2.65	1.44	1.44	2.56
1948...	2.73	2.94	1.62	1.63	2.98
1949...	2.75	3.20	1.70	1.70	3.00
1950...	2.88*	3.30*	1.802*	1.802*	3.14*
1951...	3.09*	3.548*	1.957*	1.957*	3.348*
1952...	3.152*	3.674*	2.021*	2.021*	3.411*
1953...	3.335*	3.858*	2.184*	2.184*	3.591*
1954...	3.57*	4.033*	2.415*	2.415*	3.975*

* Incl benefits after Sept. 1950

- **NYC workers get these benefits under new 1955 wage contracts. For benefits under previous contract see page 155, Oct. 7, 1954.**
- **WELFARE:** 5%—carpenters, common labor**, roofers**, waterproofers, hoisting engineers, shovel operators; 4%—bricklayers, reinforcing ironworkers*, cement finishers*, lathers*, painters**; 3%—structural ironworkers**, mosaic & terrazzo**, glaziers†, steamfitters**, sheet metal workers**; 15¢ hr—plasterers; 6% welfare and pension—tile layers; 5% welfare and pension, 1% national contribution—electricians; 12% fringe benefits—plumbers.

† Also 5% pension; * 4% pension; ** 3% pension.

- **PENSION:** 20¢ hr—bricklayers; 5%, 4%, 3%—see welfare; 15¢ hr—plasterers
- **BENEFIT FUND:** 20¢ hr—plasterers; 3%—waterproofers
- **VACATION FUND:** 4%—electricians; 2% steamfitters, sheet metal workers
- **PAID HOLIDAYS:** 6 ea—carpenters, electricians, hoisting engineers, tractor operators, power shovel operators
- **COST OF LIVING ESCALATORS:** most trades
- **CONTRACT STATUS:** carpenters, reinforcing ironworkers, common labor, cement finishers, lathers, glaziers, plumbers, roofers, waterproofers, sheet metal workers, hoisting engineers, mosaic & terrazzo, steamfitters, expire 6/30/57; bricklayers, 6/30/56; structural ironworkers, 6/30/58

Consumer Price Index

US Bu of Labor Statistics—1947-49 = 100

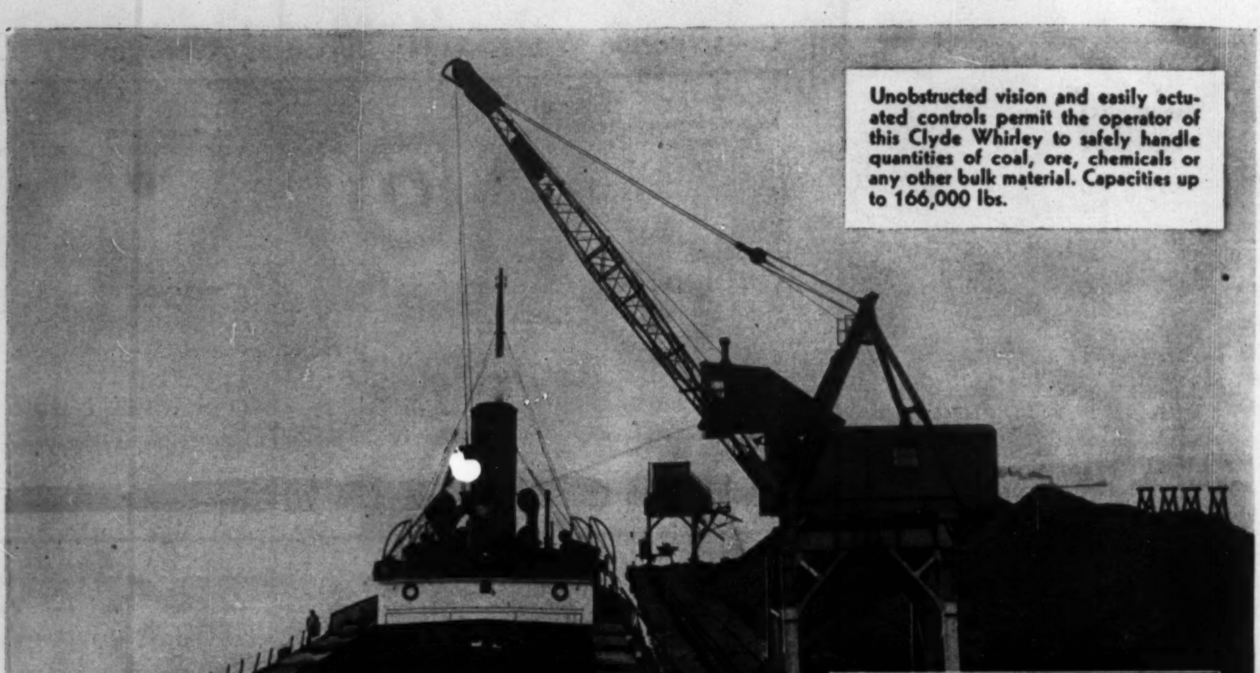
	1939#	1945#	1949#	1950#	1952#	1953*	1954*	1955*
Jan	59.6	76.1	102.7	100.6	113.1	113.9	115.2	114.3
Feb	59.4	76.0	101.6	100.4	112.4	113.4	115.0	114.3
Mar	59.3	76.0	101.9	100.7	112.4	113.6	114.8	114.3
Apr	59.2	76.1	102.1	100.8	112.9	113.7	114.6	114.2
May	59.1	76.7	101.8	101.3	113.0	114.0	115.0	114.2
Jun	59.0	77.3	102.0	101.8	113.4	114.5	115.1	114.4
Jul	59.2	77.5	101.4	102.9	114.1	114.7	115.2	114.7
Aug	59.0	77.5	101.6	103.7	114.3	115.0	115.0	.....
Sept	60.2	77.2	102.1	104.4	114.1	115.2	114.7	.....
Oct	60.0	77.2	101.5	105.0	114.2	115.4	114.5	.....
Nov	59.9	77.5	101.6	105.5	114.3	115.0	114.6	.....
Dec	59.6	77.8	101.0	106.9	114.1	114.9	114.3	.....

Pre-depr. high; 77.0, Nov 1926—Depr. low; 53.6, Apr 1933.
* For details of latest revision see the February '53 Monthly Labor Review.
# Interim adjusted series converted from 1935=39=100 1947=49=100 base.

Construction Wages and Benefits

The wages reported monthly by ENR include take-home pay plus fringe benefits. During the first nine months of 1955, the ENR 20-Cities average wage rates showed common laborers coming up with less of an increase on the average than in '54. This year, the average increased by 6.8 cents per hour, compared with an 8.0 cents average raise during the same period of 1954. In contrast, skilled workers came up with the same increase on the average this year as last. The 20-Cities average for the three key skilled trades–bricklayers, carpenters and structural ironworkers –rose by 8.7 cents per hour, equal to the average increase during the first nine months of 1954.

Construction workers real wages rose in line with actual wage increases as living costs remained stable for the second consecutive year. In fact, the BLS Consumer Price Index in July '55 was the same as in July '53. However, the Consumer Price Index shows signs of starting to creep upward.



Unobstructed vision and easily actuated controls permit the operator of this Clyde Whirley to safely handle quantities of coal, ore, chemicals or any other bulk material. Capacities up to 166,000 lbs.

On the go or on the spot . . . Clydes cut handling costs

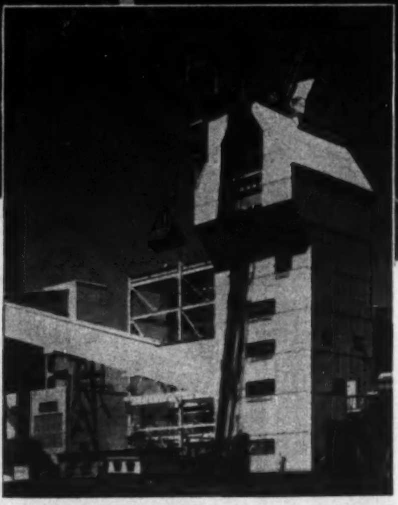
Clyde Whirleys and Clyde Unloaders are writing records of profitable operation wherever bulk materials are handled! Carefully engineered for each particular operation, these faster-cycling, easier-to-operate units, with simplified controls, are resulting in fatigue-free operation and greater tonnage moved per hour.

DESIGNED FOR SAFER, MORE EFFICIENT SERVICE!

Self-propelled Clyde Whirleys and Clyde Unloaders give a flexibility of operation and a handling capacity ordinarily associated with a multi-unit installation. Anti-friction bearings throughout, the latest improved system of controls combined with many other Clyde features provide the most economical and dependable machines for high production duty. That's why owners and operators around the world 'take pride in their Clyde' . . . a pride justified by many years of continuous, trouble-free, *safe* operation.

Whatever your requirements for the handling of bulk material, Clyde engineers offer their assistance in the profitable solution of your problems. And there's no obligation when you call on the more-than-half-century experience of Clyde!

WRITE TODAY FOR FULL INFORMATION . .



"Fleet-Block Reeving", a patented Clyde feature, provides faster horizontal bucket travel as trolley traverses in or out on the boom. Clyde Unloaders are available in capacities up to 1200 tons per hour.

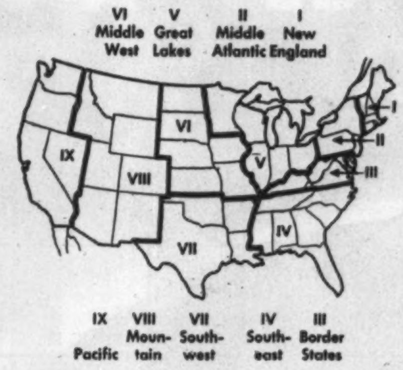
Clyde drum and capstan type car pullers and barge movers facilitate loading, unloading or re-handling operations at loading stations. Units are safety engineered and quality constructed to give long-life, trouble-free operation.

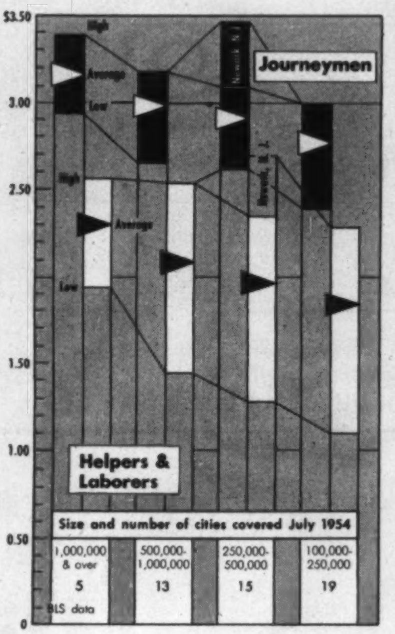
HOISTS—DERRICKS—WHIRLEYS—BUILDERS TOWERS—CAR PULLERS—HANDI-CRANES—ROLLERS

CLYDE

CLYDE IRON WORKS, INC.
Established in 1899
DULUTH 1, MINNESOTA

ONE OF THE 16 INTEGRATED COMPANIES
BARIUM STEEL CORPORATION
WORKING IN STEEL, ALUMINUM MAGNESIUM, FIBERGLASS





Average Union Wages, Building Trades, by Area

Bureau of Labor Statistics, July 1, 1954

Trade	United States	I New England	II Middle Atlantic	III Border States	IV South-east	V Great Lakes	VI Middle West	VII South-west	VIII Moun-tain	IX Pacific
All building trades	$2.80	$2.60	$3.05	$2.63	$2.30	$2.92	$2.78	$2.50	$2.54	$2.75
Journeymen	2.99	2.82	3.27	2.90	2.64	3.05	2.93	2.75	2.76	2.87
Asbestos workers	3.07	2.89	3.28	2.99	2.74	3.13	3.01	2.98	2.85	3.07
Boilermakers	3.11	3.00	3.44	3.01	2.90	3.13	2.96	2.90	3.01	3.05
Bricklayers	3.39	3.10	3.69	3.31	3.06	3.29	3.45	3.36	3.22	3.28
Carpenters	2.90	2.66	3.26	2.80	2.44	3.01	2.86	2.55	2.71	2.75
Cement finishers	2.87	3.01	3.24	2.63	2.35	2.94	2.92	2.53	2.67	2.71
Electricians (inside wiremen)	3.09	2.90	3.30	3.05	2.85	3.14	3.06	2.97	2.89	3.05
Elevator constructors	3.12	2.99	3.35	3.09	2.86	3.11	3.02	2.98	2.96	3.10
Glaziers	2.67	2.50	2.98	2.61	2.15	2.86	2.79	2.28	2.30	2.49
Lathers	3.22	3.05	3.30	3.14	2.71	3.18	3.00	3.16	3.11	3.33
Machinists	3.07	2.75	3.33	3.00	2.50	3.06	2.99	2.91	2.78	2.90
Marble setters	3.06	2.95	3.18	3.16	2.94	3.12	3.02	2.83	2.80	2.96
Mosaic and terrazzo workers	3.01	2.93	3.24	2.97	2.96	2.98	3.13	2.66	3.09	2.95
Painters	2.77	2.48	2.85	2.54	2.37	2.90	2.72	2.50	2.53	2.78
Paperhangers	2.73	2.61	2.61	2.28	2.48	2.89	2.66	2.38	2.51	2.78
Plasterers	3.27	3.12	3.52	3.17	2.65	3.21	3.13	3.09	3.15	3.36
Plumbers	3.12	2.95	3.39	2.96	2.90	3.11	3.01	2.92	2.93	3.15
Rodmen	2.90	3.18	3.31	2.79	2.47	3.03	2.87	2.60	2.74	2.69
Roofers, composition	2.76	2.76	3.09	2.32	2.01	2.90	2.68	2.24	2.75	2.72
Roofers, slate and tile	2.82	3.01	3.03	2.91	2.18	3.02	2.64	2.43	2.51	2.77
Sheet-metal workers	2.96	2.86	3.25	2.84	2.57	3.00	3.05	2.74	2.66	2.91
Steam and sprinkler fitters	3.11	2.91	3.37	2.93	2.91	3.15	3.08	2.98	2.97	3.13
Stonemasons	3.25	3.10	3.27	3.27	3.14	3.21	3.36	3.38	3.30	3.23
Structural iron workers	3.08	3.21	3.33	3.10	2.68	3.15	2.92	2.84	2.78	2.90
Tile layers	3.05	3.02	3.25	2.98	2.80	3.06	2.95	2.71	2.81	3.04
Helpers and laborers	2.05	1.99	2.28	1.72	1.37	2.26	2.10	1.47	1.97	2.18
Bricklayers' tenders	2.22	1.99	2.45	1.68	1.29	2.30	2.20	1.53	2.25	2.50
Building laborers	1.98	1.97	2.15	1.70	1.38	2.22	2.03	1.40	1.85	2.09
Composition roofers' helpers	1.89	2.00	1.96	1.75	1.35	2.02	1.95	1.48	....	2.00
Elevator constructors' helpers	2.23	2.10	2.46	2.18	2.00	2.17	2.16	2.12	2.09	2.17
Marble setters' helpers	2.22	2.10	2.29	2.17	1.35	2.43	2.06	1.63	2.05	2.26
Plasterers' laborers	2.30	2.14	2.51	1.88	1.43	2.40	2.42	1.69	2.28	2.95
Plumbers' laborers	2.09	....	2.23	1.74	1.27	2.39	2.27	1.55	2.09	2.19
Terrazzo workers' helpers	2.39	2.12	2.60	1.99	1.35	2.44	2.27	1.58	1.96	2.41
Tile layers' helpers	2.33	2.12	2.56	2.18	1.35	2.37	2.08	1.58	2.05	2.26

Average Hourly* Earnings on Contract Construction

Bureau of Labor Statistics, dollars per hour

	Building*						Non building*						Manufacturing					
	1946	1949	1950	1953	1954	1955	1946	1949	1950	1953	1954	1955	1946	1949	1950	1953	1954	1955
Jan	$1.40	$1.92	$1.98	$2.41	$2.58	$2.65	$1.30	$1.71	$1.75	$2.18	$2.33	$2.31	$1.00	$1.41	$1.42	$1.74	$1.80	$1.84
Feb	1.42	1.93	1.99	2.42	2.59	2.65	1.30	1.71	1.77	2.19	2.29	2.33	1.00	1.40	1.42	1.74	1.80	1.85
Mar	1.41	1.93	2.00	2.44	2.59	2.63	1.28	1.70	1.77	2.20	2.27	2.31	1.04	1.40	1.42	1.75	1.79	1.85
Apr	1.42	1.93	1.99	2.44	2.58	2.63	1.31	1.71	1.75	2.18	2.28	2.34	1.06	1.40	1.43	1.75	1.80	1.86
May	1.43	1.93	2.00	2.44	2.58	2.63	1.31	1.71	1.76	2.19	2.32	2.34	1.07	1.40	1.44	1.76	1.81	1.87
June	1.44	1.92	2.00	2.44	2.58	2.64	1.31	1.70	1.76	2.19	2.31	2.34	1.08	1.41	1.45	1.77	1.81	1.87
July	1.47	1.92	2.01	2.47	2.58	....	1.36	1.71	1.78	2.22	2.31	....	1.09	1.41	1.46	1.77	1.80	1.88
Aug	1.48	1.93	2.02	2.49	2.60	....	1.35	1.71	1.79	2.26	2.32	....	1.11	1.40	1.46	1.77	1.79	....
Sept	1.51	1.94	2.07	2.52	2.62	....	1.37	1.73	1.83	2.28	2.33	....	1.13	1.41	1.48	1.79	1.81	....
Oct	1.53	1.94	2.08	2.54	2.63	....	1.40	1.74	1.83	2.31	2.33	....	1.14	1.39	1.50	1.79	1.81	....
Nov	1.55	1.95	2.09	2.55	2.63	....	1.43	1.75	1.84	2.31	2.34	....	1.15	1.39	1.51	1.79	1.83	....
Dec	1.57	1.96	2.12	2.57	2.65	....	1.43	1.78	1.88	2.30	2.33	....	1.16	1.41	1.54	1.80	1.83	....

* Series revised March, 1948 to cover both public and private contract construction and to include workers engaged in off-site operations for construction as well as site workers.

Work Injuries Drop

The construction industry cut work injuries by 9% in 1954. The total number of disabling injuries declined to 205,000 in 1954, as estimated by the Department of Labor, fewest since 1950. This compares with a record 230,000 injuries in 1951 and 1953's near-record of 225,000.

Latest figures for the frequency rate of work injuries show that construction reduced its rate in 1953 to 32.9 per million man-hours worked from 35.3 in 1952. The '54 rate was well below the 41.0 in 1950.

Work Injury Rates in Construction, 1952–1953

Bureau of Labor Statistics

	Number estabs reporting	Injury frequency[a] 1953	Injury frequency[a] 1952	1953 severity[b] rate	Aver days lost[d]	1953 Injuries resulting in Perm total[c] %	Perm partial %	Temp total %
Contract construction	4,686	32.9	35.3*	3.2	107	1.0	2.4	96.6
General building contractors	1,567	37.2	38.1	3.0	80	0.6	2.3	97.1
Heavy construction	284	31.2	29.8*	4.0	130	1.3	3.6	95.1
Highway & street	496	38.5	46.0	4.7	123	1.2	2.4	96.4
Special-trade contractors	2,339	27.8	31.4*	2.6	116	1.3	1.6	97.1
Plumb, heat, air cond	608	25.6	31.3	1.9	75	0.7	1.8	97.5
Painting & decorating	314	23.0	23.6	...	...	...	...	....
Electrical	322	23.6	30.6	1.9	80	1.0	0.2	98.8
Masonry, stonework, tile setting & plastering	335	30.9	31.7	2.0	65	0.5	1.0	98.5
Roofing & sheet-metal	207	35.1	38.0	3.9	109	1.4	0.3	98.3
Structural steel erection	50	44.8	46.9	8.9	267	3.1	2.8	94.1
Misc. spec-trade contractors	503	32.3	35.3*	4.5	132	1.6	2.3	96.1

[a] average number of disabling work injuries per million employee-hours worked [b] average number of days lost for each 1,000 employee-hours worked [c] permanent, including death [d] charged to each case * revised

$ per week & hours worked

	1954 Earn/wk	1954 Hrs/wk	Apr. 1955 Earn/wk	Apr. 1955 Hrs/wk
All contr constr	$93.98	37.0	$92.26	35.9
Building	94.12	36.2	93.10	35.4
General	89.41	36.2	87.15	35.0
Spec trade	98.01	36.3	97.10	35.7
Plumb & heat	102.71	37.9	102.85	37.4
Paint & decor	90.39	34.5	90.51	33.9
Electrical	112.71	38.6	112.81	38.5
Other	93.19	35.3	92.92	34.8
Non-building	92.86	40.2	89.15	38.1
Highway & street	86.88	40.6	81.53	38.1
Other	97.36	39.9	95.25	38.1

Average hourly earnings on contract construction increased at a slower pace in '55 than in recent years. BLS figures for July '55 show workers on building construction averaged $2.64 per hour, six cents more than in July '54. This compares with a 14-cent increase between July '53 and July '54. On nonbuilding construction, July '55 earnings averaged $2.34 per hour, three cents over a year ago. This was much less than the 12-cent gain between July '53 and July '54.

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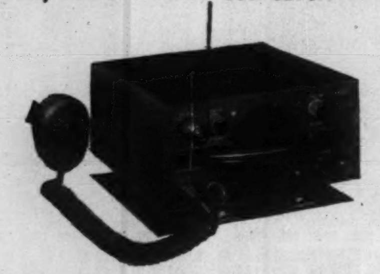
2-WAY RADIO

gets the maximum use out of your heavy equipment!

For directing operations and for getting instant action in case of break-down, 2-way radio is a vital cost-saver.



The new Industrial Radio PAK-FONE Model J is small (only 10″ x 9″ x 5″), completely self-contained and may be used in heavy equipment, vehicles or as a base station. It operates on 6, 12, 24 volts D.C. and 117 volts A.C. with only 1½ ampere drain at 12 volts (on standby). Minimum installation is required as no extra dynamotors, power supplies, controls or loudspeakers are required. Unit may be removed for transfer or maintenance in less than 1 minute.

Portable PAK-FONES

When no power is available, such as on bridges or towers, or in areas where vehicles cannot operate, you can still have 2-way radio with portable self-powered PAK-FONES. Loudspeaker permits unattended reception. Several types and sizes to suit each requirement.

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428 N. Parkside Ave., Chicago 44, Ill.

Gentlemen:
We are interested in 2-way radio for the following applications:

☐ For heavy equipment.
☐ For base station.
☐ For Superintendent's and maintenance vehicles.
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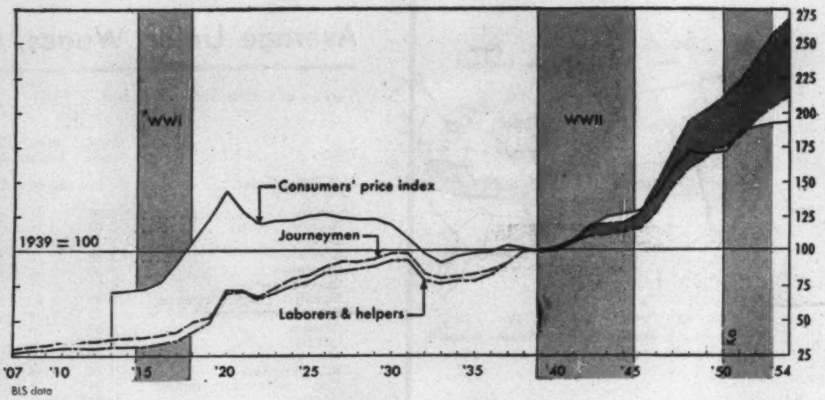
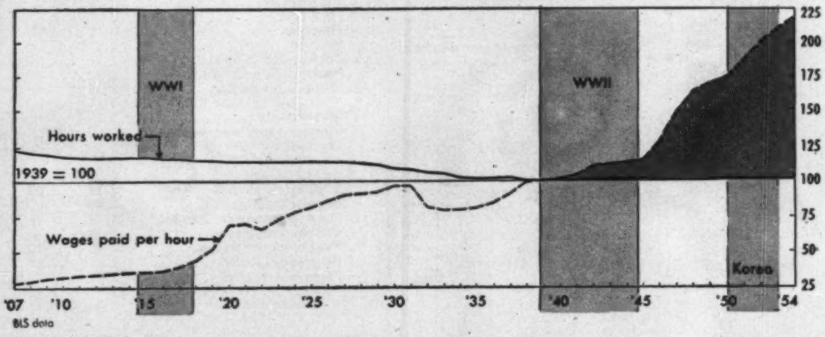


BLS data



BLS data

Union Labor Trends, US Bu of Labor Statistics

Wage rates per hour—Index, 1939 = 100

Year	All Building Trades	Journeymen	Helpers & Laborers	Bricklayers	Carpenters	Cement Finishers	Electricians Inside Wiring	Glaziers	Lathers	Painters	Plasterers	Plumbers & Gas Fitters	Sheet Metal Workers	Steam & Sprinkl Fitrs	Stonemasons	Structural Ironworkers	Building Laborers	Bricklayers' Tenders
1907M...	29.3	29.7	27.3	37.7	29.8	34.5	27.9	....	....	26.2	37.3	33.3	30.6	30.1	33.9	27.9	30.8	30.3
1913M...	36.1	36.9	31.8	41.5	36.8	38.0	33.8	....	34.6	35.5	39.3	37.9	35.6	35.0	36.7	37.3	34.2	31.8
1926M...	88.3	88.7	84.9	94.1	88.5	86.6	81.5	80.7	83.0	90.9	92.4	83.9	86.3	84.9	92.7	81.1	86.9	85.5
1930M...	97.0	97.5	93.3	101.8	96.9	95.4	90.9	92.6	89.6	100.6	98.1	91.5	94.7	93.5	99.1	92.5	92.9	94.9
1932M...	83.1	83.6	79.2	87.0	79.6	83.6	87.9	78.0	80.0	85.3	81.4	80.5	83.4	81.0	88.4	81.0	78.7	78.4
1938J....	99.3	99.3	99.2	99.5	99.8	99.6	99.5	99.3	96.8	99.2	99.2	99.1	98.6	99.3	99.7	98.9	99.4	99.7
1942.....	111.9	110.9	117.5	108.3	112.1	110.8	113.5	108.8	109.1	110.5	105.0	110.5	116.0	109.3	108.0	108.7	119.6	115.7
1946.....	129.3	126.8	146.3	125.6	129.7	128.2	124.9	123.4	124.2	127.3	119.0	123.2	133.0	124.6	126.5	121.4	152.2	141.7
1948.....	163.5	159.4	192.7	165.6	164.7	161.1	154.4	155.5	157.8	154.4	148.2	158.2	164.4	154.3	166.9	151.9	200.8	185.5
1949.....	170.3	166.1	199.8	174.0	169.1	165.8	168.1	160.5	164.2	162.1	161.9	162.8	169.6	161.3	175.7	157.4	208.4	190.4
1950.....	177.8	173.2	210.8	180.4	177.4	172.7	172.3	169.4	179.6	167.7	169.3	166.7	177.9	168.3	187.1	164.8	220.0	203.4
1951.....	189.1	184.0	225.3	188.0	189.1	183.7	185.4	177.8	188.0	178.7	177.5	176.6	188.1	178.6	193.6	175.7	235.6	213.9
1952.....	200.8	195.3	240.0	203.9	200.6	192.2	196.0	186.0	194.4	190.2	187.6	187.0	202.2	189.1	207.5	184.0	251.7	228.0
1953.....	211.2	204.9	256.6	210.0	211.1	203.8	204.0	199.1	203.4	199.5	194.8	193.8	211.5	197.9	210.9	194.5	270.8	240.0
1954.....	218.9	212.2	267.7	216.8	217.9	209.7	210.0	204.9	208.7	205.7	198.4	204.5	221.5	208.5	215.7	201.3	282.6	250.4

Hours worked per week—Index, 1939 = 100

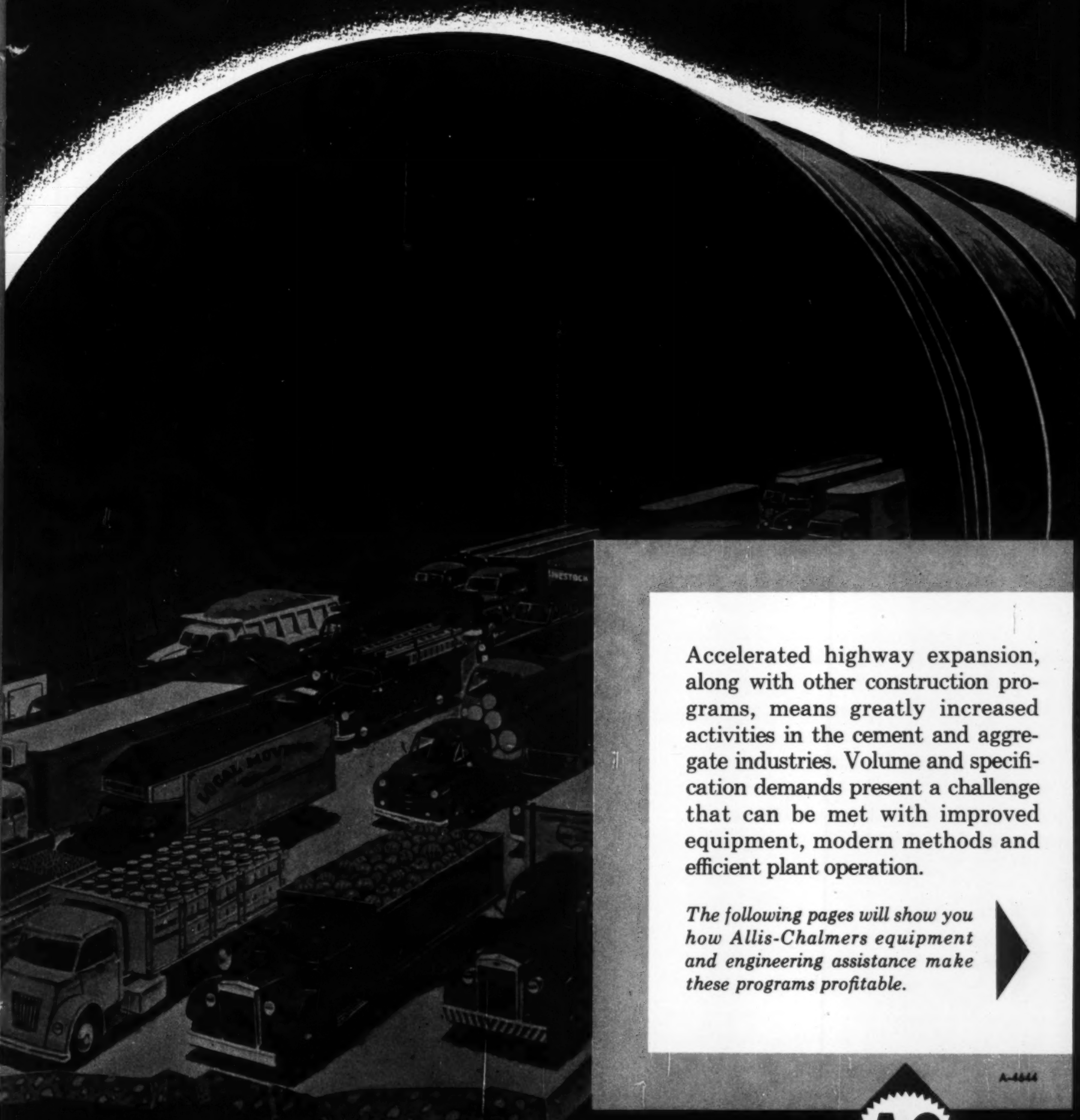
Year	All Building Trades	Journeymen	Helpers & Laborers	Bricklayers	Carpenters	Cement Finishers	Electricians Inside Wiring	Glaziers	Lathers	Painters	Plasterers	Plumbers & Gas Fitters	Sheet Metal Workers	Steam & Sprinkl Fitrs	Stonemasons	Structural Ironworkers	Building Laborers	Bricklayers' Tenders
1907M...	124.3	123.8	126.1	122.9	121.0	122.7	124.2	....	....	133.1	125.8	120.6	117.0	120.3	118.4	121.3	121.6	118.9
1913M...	118.2	118.0	118.3	114.9	115.6	119.8	120.7	....	121.8	125.9	124.3	119.2	114.9	118.0	115.7	114.1	118.3	116.0
1926M...	114.9	115.1	113.9	113.3	113.5	113.4	115.9	117.5	118.9	120.7	118.2	116.5	111.8	114.4	114.5	112.8	112.1	113.9
1930M...	109.8	110.0	109.0	107.1	109.4	108.1	109.9	112.4	110.4	115.4	113.0	109.9	106.9	108.5	107.1	108.8	110.0	106.9
1932M...	106.5	106.6	105.7	103.1	105.0	105.6	106.2	107.9	109.3	114.2	110.1	108.0	103.6	106.4	104.8	104.8	104.9	104.0
1938J....	100.2	100.1	100.2	99.0	100.0	100.0	100.2	100.2	100.8	110.4	100.0	99.7	100.0	99.6	100.1	100.1	100.1	100.3
1942.....	101.1	101.8	98.8	100.8	100.8	100.6	104.5	102.0	102.5	106.5	102.0	99.9	100.9	102.2	100.2	101.1	98.8	98.6
1946.....	100.2	101.1	97.5	100.3	103.3	100.4	100.4	102.0	102.2	106.1	104.1	98.3	100.8	101.3	100.0	101.1	97.2	96.9
1948.....	100.1	101.0	97.4	100.5	100.2	100.0	100.4	103.5	98.1	106.2	102.9	97.6	100.1	101.3	101.0	101.1	97.2	96.4
1949.....	100.2	101.1	97.4	100.1	100.2	100.0	102.1	103.5	98.1	106.2	103.5	97.6	99.9	101.3	100.8	101.1	97.2	96.4
1950.....	100.3	101.2	97.4	100.1	100.2	100.0	102.1	103.5	100.2	106.2	105.9	98.2	99.9	101.3	100.8	101.1	97.2	96.4
1951.....	100.2	101.1	97.3	100.2	100.2	100.0	102.1	103.5	100.2	104.9	105.9	98.2	99.9	101.3	100.9	101.1	97.0	96.2
1952.....	100.2	101.1	97.5	100.2	100.2	100.0	101.1	103.5	100.2	104.9	105.9	98.2	99.9	101.3	100.9	101.1	97.1	96.3
1953.....	100.2	101.1	97.5	101.2	100.2	100.0	101.1	103.5	100.3	104.9	105.9	98.2	99.9	101.3	100.9	101.1	97.1	96.3
1954.....	100.2	101.1	97.5	100.2	100.2	100.0	101.1	103.5	99.8	104.9	105.9	98.2	99.9	101.3	100.9	101.1	97.1	96.3

• M May 1. • J June 1. • All others July 1.

Average wage rate increase in 85 cities—January to July

	Per cent				Cents per hour				Rates, July 1, 1954			Rates, July 1, 1955		
	1Q		2Q		1Q		2Q		Low	Aver	High	Low	Aver	High
Trade	'54	'55	'54	'55	'54	'55	'54	'55						
Bricklayers......	0.2	0.3	2.3	1.3	0.7	1.0	7.6	4.5	$2.50	$3.39	$3.80	$2.50	$3.47	$3.85
Carpenters......	0.2	0.1	1.3	2.4	0.5	0.2	3.8	6.9	2.10	2.89	3.50	2.18	3.01	3.55
Electricians.....	0.3	0.1	1.5	1.1	0.8	0.4	4.6	3.4	2.45	3.09	3.50	2.60	3.17	3.65
Painters.........	0.9	0.1	1.2	2.2	2.4	0.2	3.4	6.1	1.75	2.77	3.13	1.75	2.87	3.25
Plasterers.......	0.1	0.2	0.9	1.8	0.3	0.5	2.9	5.9	2.25	3.27	3.75	2.25	3.36	3.85
Plumbers........	0.1	0.1	2.0	1.2	0.4	0.3	6.1	3.9	2.50	3.12	3.50	2.63	3.19	3.50
Bldg laborers....	0.4	0.3	2.3	3.1	0.8	0.6	4.4	6.0	0.90	1.94	2.70	0.90	2.04	2.80

WANTED — More Cement ...More Aggregates



Accelerated highway expansion, along with other construction programs, means greatly increased activities in the cement and aggregate industries. Volume and specification demands present a challenge that can be met with improved equipment, modern methods and efficient plant operation.

The following pages will show you how Allis-Chalmers equipment and engineering assistance make these programs profitable.

A-4644

ALLIS-CHALMERS

Milwaukee 1, Wisconsin

How ALLIS-CHALMERS Helps

ENGINEERING HELP for plant operators and consultants

Ahead of you lie what could be your most profitable years. Is your plant ready to handle the volume? Is your plant geared to meet rigid specifications, economically? The best way of finding out is to get in touch with Allis-Chalmers for an expert evaluation of your present processing operations.

Why Allis-Chalmers? — No other company builds as many types and sizes of integrated processing machinery, power generation and utilization equipment. In examining your problems, Allis-Chalmers is not only concerned with correct application of machinery but with overall plant efficiency . . . ways and means of making existing as well as new equipment "team up" to produce maximum volumes of desired products at lowest cost.

Valuable Assistance for You or Your Consultant — Flow and plant design, pre-recommendation research and pilot plant testing, expert installation and service are all available from Allis-Chalmers, a company with over a century of experience in designing, building and applying processing machinery.

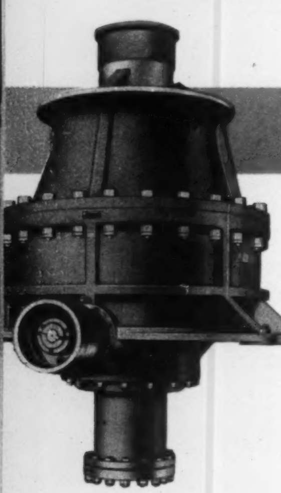
Unbiased Recommendations — Whether you operate a small pit or a complicated production system, the facilities and experience of Allis-Chalmers are at your disposal. And Allis-Chalmers broad scope of integrated equipment permits making unbiased recommendations, dictated entirely by your specific needs.

Service Everywhere . . . At All Times — Allis-Chalmers interest in your problems does not end with the installation of equipment. Laboratory facilities, periodic check-up, maintenance and fast emergency parts service are yours continuously through your nearby Allis-Chalmers representative.

Allis-Chalmers Rotary Kilns for Cement and Lightweight Aggregate Production

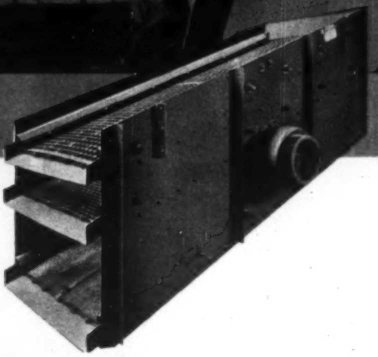
Cement operators have long acknowledged the superiority of Allis-Chalmers rotary kilns—superiority that is reflected in long-term dependability as well as low-cost operation and maintenance.

Efficient kiln design is a result of Allis-



Hydraulically Adjusted Crushers Afford One-Man, One-Minute Product Control

Most Allis-Chalmers gyratory crushers are supplied with hydraulic adjustment which provides precise product size control by the flick of a finger. Compensation for wear and emergency unloading are controlled in the same manner. Other Allis-Chalmers crushers include a broad range of jaw crushers, roll crushers, and multi-impact hammermills.



Vibrating Screens for Every Application

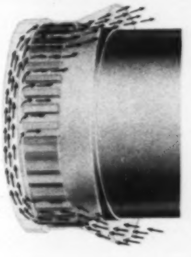
Allis-Chalmers builds a complete line of vibrating screens, including units for scalping, medium and fine separation, wet or dry screening, rinsing and dewatering.

Cement and Aggregate Plants

★ *Increase Volume*
★ *Meet Specifications*

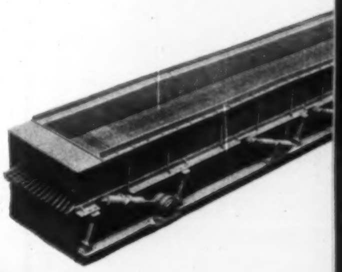
Chalmers specialized engineering and the experience gained in building and applying hundreds of kilns in the last 50 years.

Allis-Chalmers all-welded rotary kilns are built in standard and special sizes for a wide variety of uses, including cement manufacturing and the production of lightweight aggregates, lime, refractory materials, fertilizers and chemicals.



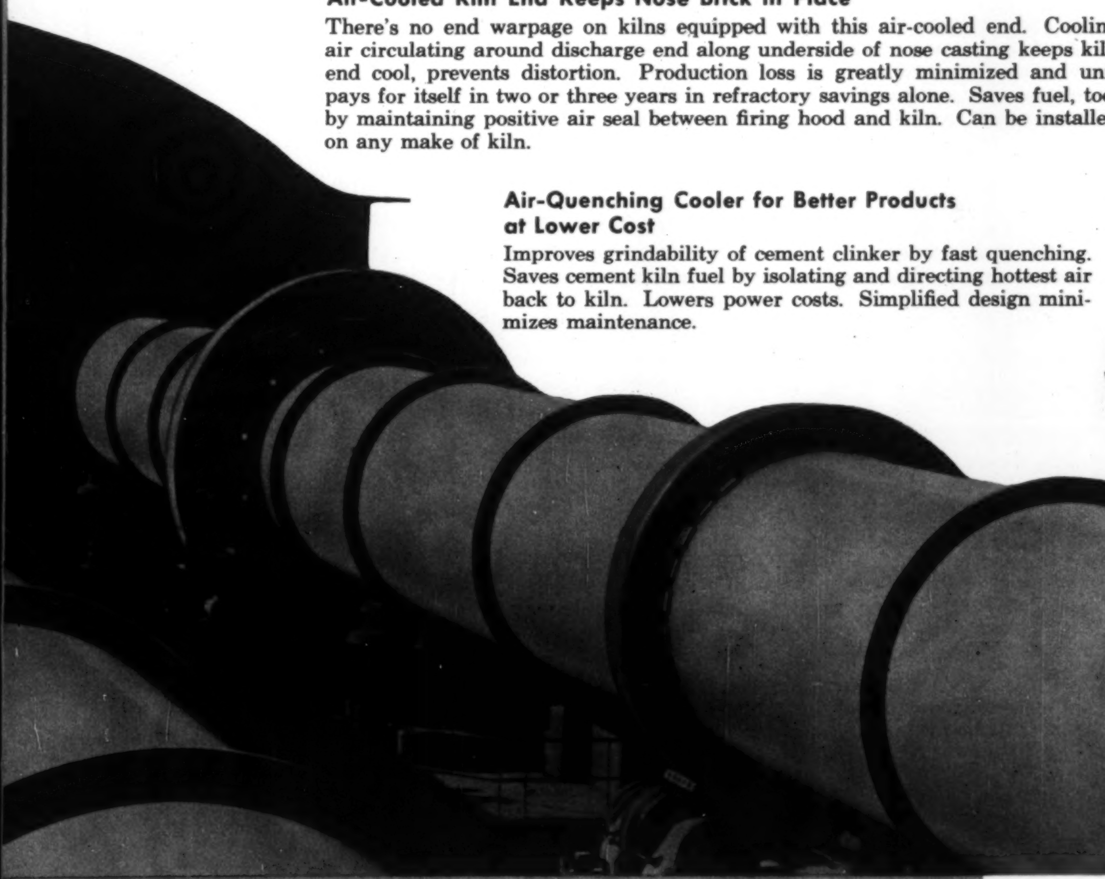
Air-Cooled Kiln End Keeps Nose Brick in Place

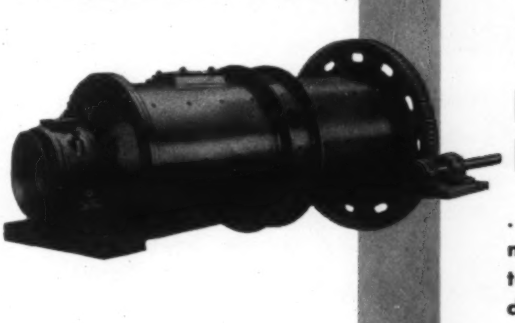
There's no end warpage on kilns equipped with this air-cooled end. Cooling air circulating around discharge end along underside of nose casting keeps kiln end cool, prevents distortion. Production loss is greatly minimized and unit pays for itself in two or three years in refractory savings alone. Saves fuel, too, by maintaining positive air seal between firing hood and kiln. Can be installed on any make of kiln.



Air-Quenching Cooler for Better Products at Lower Cost

Improves grindability of cement clinker by fast quenching. Saves cement kiln fuel by isolating and directing hottest air back to kiln. Lowers power costs. Simplified design minimizes maintenance.





Grinding Mills for Profitable Production of Specification Sand

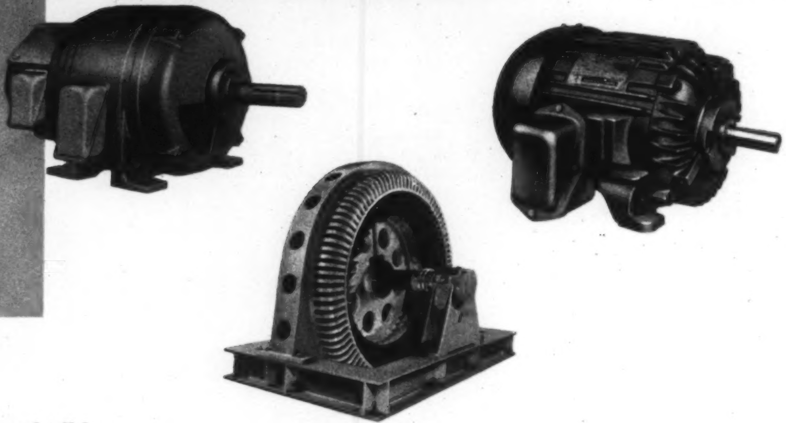
Because of stringent specifications, decreasing natural sand reserves and local variations in sand and gravel, operators are "manufacturing" sand in Allis-Chalmers rod mills. These mills are simple to operate. Maintenance is low. Allis-Chalmers also manufactures many other types of mills used wherever finely ground materials are produced, including multi-compartment mills for grinding cement raw materials and clinker.

***In addition to processing machinery, Allis-Chalmers supplies the required**

ELECTRICAL EQUIPMENT

. . . machinery and equipment designed to work together, backed by undivided responsibility.

ALLIED ELECTRICAL EQUIPMENT



MOTORS — Allis-Chalmers builds a complete line of polyphase squirrel-cage and wound-rotor induction motors for every industrial use. These, as well as synchronous and direct current motors, are available with electrical and mechanical modifications to meet a wide variety of applications. Mechanical modifications obtainable include drip-proof, splash-proof and totally-enclosed fan-cooled construction in vertical as well as horizontal types. Many ratings are available with flange-type construction.

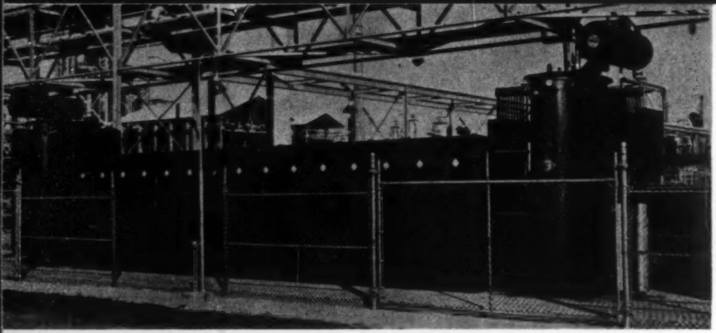
Squirrel-Cage Motors — Most used of all motors is constant speed three-phase cage motor. Construction simplicity makes initial cost and maintenance low.

Wound-Rotor Motors — Used for constant speed duty requiring frequent reversing or starting under heavy load; high starting torque. Also suitable for adjustable-varying speed duty.

Synchronous Motors — Applicable to most constant speed drives. Operating characteristics include high efficiency and the ability to improve system power factor. Widely used for grinding mills, either through magnetic clutches or as direct-connected high torque motors.

Direct Current Motors — Occasionally used for adjustable-speed service, such as for kiln drives.

ALLIS-CHALMERS



UNIT SUBSTATIONS

Switchgear is the key to power continuity. In the substation illustrated, double-ended switchgear is combined with duplicate Allis-Chalmers power transformers.

Allis-Chalmers switchgear offers the following advantages:

Saves Space — Compartments have been designed to permit adding special transfer bus or ring bus without adding cubicles.

Saves Cost — Elimination of duplicate facilities or extra cubicles cuts equipment cost.

Saves Time — Dry-type bus joint insulation simplifies adding or removing cubicles. There are no compounds to melt.

CONTROL

Allis-Chalmers can supply motor control for practically every application. Shown is the Type H Control for 2300-5000-volt motors. Starter is provided with air or oil contactor. Meters, relays, fuses, switches — everything needed for the complete protection of man, motor and machine is conveniently installed in an attractive, easy-to-install cubicle.

I would like bulletins on ____________

(Type of equipment)

ALLIS-CHALMERS
Milwaukee 1, Wisconsin

Explanation of process or problem. ....

Name ....

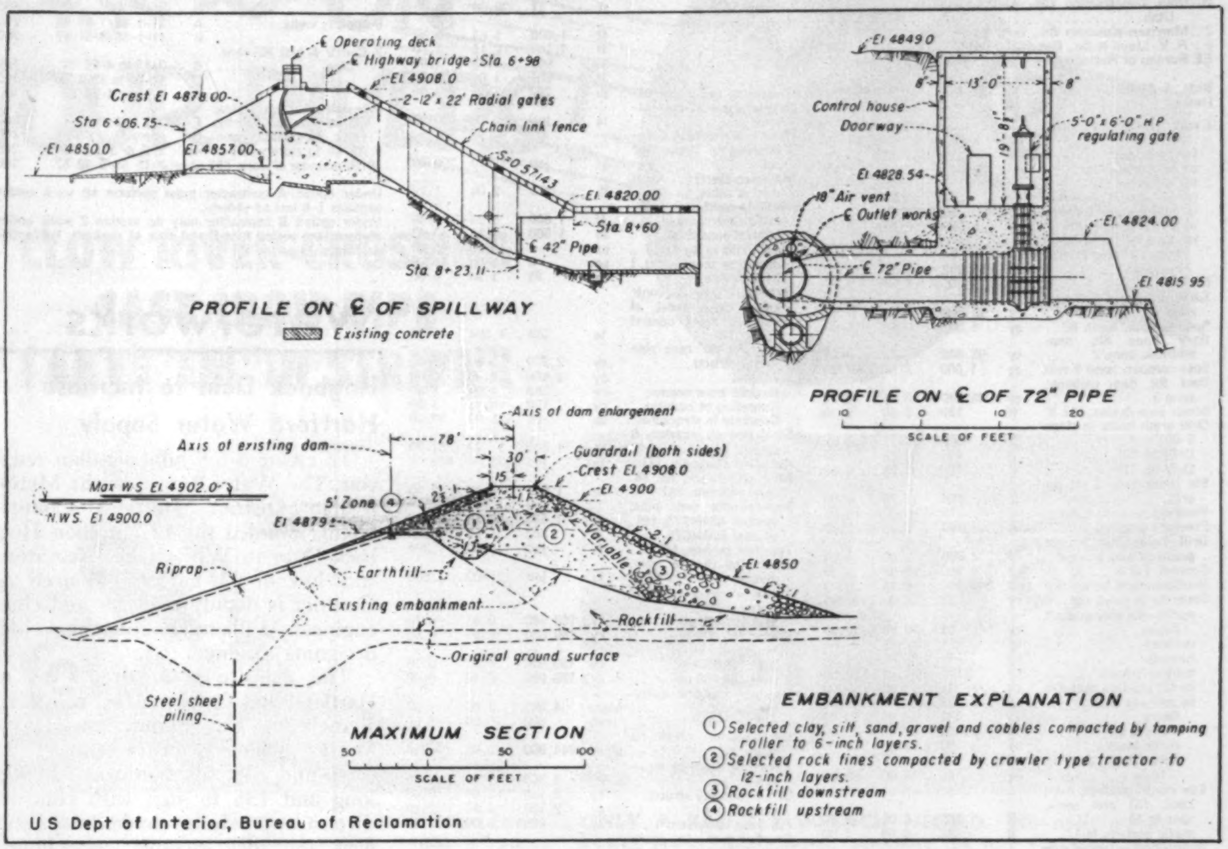
Title .... Company ....

Address ....

City .... Zone .... State ....

A-4644

Unit Prices Bid by Contractors


℄ Operating deck
℄ Highway bridge - Sta. 6+98
El. 4908.0
Crest El 4878.00
2-12' x 22' Radial gates
Sta 6+06.75
Chain link fence
El 4850.0
El 4857.00
S=0.57143
El. 4820.00
Sta. 8+60
℄ 42" Pipe
Sta. 8+23.11
PROFILE ON ℄ OF SPILLWAY
▨ Existing concrete
El 4849.0
8"
13'-0"
8"
Control house
Doorway
19'-8"
5'-0" x 6'-0" HP regulating gate
El 4828.54
18" Air vent
℄ Outlet works
El. 4824.00
℄ 72" Pipe
El 4815.95
PROFILE ON ℄ OF 72" PIPE
10 0 10 20
SCALE OF FEET
Axis of dam enlargement
Axis of existing dam
78'
30'
15
Guardrail (both sides)
Crest El. 4908.0
El. 4900
Max WS El 4902.0
N.W.S. El 4900.0
5' Zone ④
El 4879±
2½:1
2:1
①
②
③
Variable
El. 4850
Riprap
Earthfill
Existing embankment
Rockfill
Original ground surface
Steel sheet piling
MAXIMUM SECTION
50 0 50 100
SCALE OF FEET
EMBANKMENT EXPLANATION
① Selected clay, silt, sand, gravel and cobbles compacted by tamping roller to 6-inch layers.
② Selected rock fines compacted by crawler type tractor to 12-inch layers.
③ Rockfill downstream
④ Rockfill upstream

U S Dept of Interior, Bureau of Reclamation

Enlarging Pineview Dam, Utah, with Reservoir in Operation

An exacting schedule of water lowerings, to permit spillway construction, modification of wells and a 72-in outlet pipe connection without interfering with irrigation and streamflow, dictates the scheduling of operations on raising the Pineview Dam to increase reservoir capacity by 60,000 ac ft to 110,000, as part of the Weber Basin Project, Ogden, Utah. Utah Construction Co. has a $1,372 million contract with the Bureau of Reclamation. L. N. McClellan is assistant commissioner and chief engineer, K. B. Keener is chief design engineer, Denver and Clinton D. Woods is projects manager in Ogden.

Electric power is available from Utah Power and Light Co., but the contractor must provide transmission lines, distribution circuits, transformers and other equipment needed to deliver power to where he needs it. The contractor must provide access to the job from existing roads and relocate about two and a quarter miles of existing highways. Removal of existing concrete for modification of spillway and outlet works and of some 2,000 feet of wood stave pipe, to make way for the 36-in concrete pipe for Ogden's city water supply line, precede construction operations. The main sections of the work to be done are shown with the contractor's performance time options at the end of the unit prices table.

All concrete is to be air entrained. The mix, by weight, can be varied by the engineer according to the results of tests. Concrete strength requirements vary from 3,500 to 6,000 psi at 28 days.

The government will furnish all lubricating oil and grease for the equipment to be installed, two 42" butterfly valves and steel pipe for their controls, sump pump and controls, piping, valves, fittings and metalwork for high-pressure gate controls, 42" line meter, radial gates, float-operated switches, ladders, handrails, platforms and metal covers, embedded metal work, most electrical apparatus, insulated wire and cable, cable supports, pull boxes for conduit system, wiring devices and lighting fixtures (Contractor furnishes materials and constructs and connects a self-supporting 220-volt aerial cable, a 115-volt aerial power cable, a 9-conductor aerial control cable and a 7-conductor aerial control cable from the crest of the dam to the valve control house.) Equipment and materials furnished by the government are delivered to the contractor fob cars, Ogden, Utah to be hauled 8 miles to the site of the work.

Minimum wage rates certified for this job include: carpenters $2.50 per hour, cement finishers $2.50, ironworkers either structural or reinforcing $2.80, laborers $1.775-2.15, tunnel laborers working underground $1.90-2.65, gunite men $1.90-2.50, truck drivers $1.825-2.35, tractor operators $2.225-2.50. A construction camp site area is available down stream.

All bids exceeded the engineer's estimate, the low by 20 percent and the high of six by over 50 percent. Bidders include:

Continued on following page

Pineview Dam, Utah

Continued from preceding page

1C	Utah Construction Co., Salt Lake City, Utah	$1,372,172
2	Morrison-Knudsen Co., Inc., Boise, Idaho	1,414,874
6	R. V. Lloyd & Co., Coachella, Calif	1,714,839
EE	Bureau of Reclamation, Ogden, Utah	1,143,766

Bids: 6-14-55 Items	Unit	Quantity	Unit Prices 1C	 2
Excav of exist dam embank	cy	8,000	$0.65	$0.74
for grout cap	cy	30	43.00	14.00
on right abutment	cy	78,000	2.55	2.90
for structure	cy	3,100	4.40	5.50
for 42" pipe & contr hse	cy	1,250	0.70	2.50
in outlet-works tunnels	cy	50	78.00	50.00
stripping borrow pits	cy	6,500	0.30	0.65
in borrow area and transportation to dam embank	cy	65,000	0.55	0.60
Backfill	cy	850	0.30	0.60
Earth fill, dam embank zone 1	cy	50,000	0.50	0.30
Spec compac, earth fill	cy	1,000	5.50	3.00
Rock fines fill, dam embank, zone 2	cy	55,000	0.75	0.35
Spec compac, zone 2 mat	cy	1,000	3.80	1.30
Rock fill, dam embank, zone 3	cy	45,000	0.55	0.18
Sewer pipe drains, f&c 8"	lf	120	3.50	2.00
Drill grout holes in stage 0-30'	lf	500	2.75	3.00
Drill 30-60'	lf	400	2.75	3.20
Drill 60-110'	lf	400	3.25	3.50
Std black pipe & fit for grtg	lb	300	1.15	1.00
Hook-up to grout holes	ea	15	10.00	10.00
Pressure grouting	sack	1,300	2.20	2.00
Drill holes for anchor grouting bars ip	lf	2,000	1.60	1.00
Cement, f & h	bbl	9,300	6.00	5.40
Reinforcement bars, f & p	lb	340,000	0.15	0.13
Concrete in grout cap	cy	30	28.00	20.00
outlet-wks access shaft house	cy	55	150.00	130.00
anchors	cy	175	22.00	40.00
tunnels	cy	40	87.00	56.00
control houses	cy	105	100.00	112.00
in 42" pipeline cont hse	cy	45	100.00	95.00
in spillway crest	cy	3,830	$21.00	$22.00
floors	cy	535	30.00	25.00
walls & pier	cy	1,560	60.00	60.00
baffle blocks	cy	60	50.00	32.00
oper dock & hwy brdg	cy	58	105.00	80.00
Saw cut 2" grooves, exist conc, f&i met seals, spec tp M	lf	105	8.00	5.00
metal seals tp N-1	lf	220	6.50	4.00
Remov timber tunnel supports & lagging	ls	job	4,500	3,000
Wire mesh slope mat	sy	820	15.00	4.50
Saw cut, remov exist conc	lf	365	3.00	1.40
Remov exist concrete	ls	job	18,500	3,200
Support bolts, f&i	lf	150	5.00	3.00
Metal doors, f&i	sf	105	9.00	9.00
Roofing, f&p	sf	570	0.80	0.50
Steel outlet pipes, f&i	ls	job	25,800	49,000
Backfill select mats, in 42" outlet pipe trench	cy	243	7.00	3.50
Butterfly vlvs & contr, 42" i	lb	12,000	0.10	0.30
High-pres gates, transitions, hyd hoists & gate hangars	lb	101,000	0.035	0.13
Mov & reinstal high-pres gate controls & position indicators	ls	job	2,200	4,000
New high-pres gate controls & position indicators, i	ls	job	3,400	2,000
Line meter, 42" i	ls	job	240	800
New radial gates, i	lb	31,200	0.18	0.15
Remov & dispos exist radial gates & hoists	ls	job	1,400	3,000
Float well inlet piping, f&i	ls	job	500	800
Sump pump, float control, & discharge pipe, i	ls	job	350	500
Float-oper switches for radial gate control, i	ls	job	700	1,000
Handl, revis, f mats for, & reinstal 2 rad-gate hsts	ls	job	800	900
Excav & backfill, air vent main pipe extension	cy	90	2.80	6.00
Matls for air vent main extension & air vent cov, f&i	ls	job	$675.00	$1,500
Excav, backfill, compact bf of pits for well modifica, under 6' deep	ea	20	290.00	200.00
6'-8'	ea	10	360.00	250.00
8'-10'	ea	10	680.00	300.00
over 10'	ea	5	1,100	400.00
F&i matls for well connect modifications	ls	job	7,500	11,000
Embedded metalwork, i.	lb	1,125	0.44	0.50
Ladders, handrail, platforms, & met covers, i	lb	4,200	0.47	0.20
Chain link fence, f&i	lf	430	$3.50	$4.50
Modify exist spiral stairway	ls	job	400.00	600.00
Louvers, f&i	sf	31	22.00	20.00
Electr met conduit ¾" or less, f&i	lf	1,500	1.65	0.80
1"	lf	1,100	2.15	1.10
1" & ½"	lf	600	3.25	1.60
2"	lf	200	4.00	2.90
Grounding sys matls, f&i	lb	200	3.25	3.00
Remov exist electr systems	ls	job	850.00	450.00
Remov & reinstal gasoline-engine generator set	ls	job	1,230	700.00
Single-conductor, insul wire & cable, i	lb	250	2.00	1.70
Multiple-conductor, insulated control cable, i	lf	1,800	0.20	0.40
Electrical apparatus, i	lb	1,500	1.25	0.43
Stand-light tp ltg fixt, i	ea	4	45.00	45.00
Indust-type met ltg fixt, i	ea	8	9.00	11.00
Wiring devices, i	ea	25	2.20	5.00
Overhead pwr & contr cable circs, crest of dam to valve control house, f&i	ls	job	4,200	4,000
Excav, for 36" conc pipe line & structs	cy	2,200	2.00	1.50
Backfill	cy	2,400	2.80	0.50
Backfill from borrow	cy	250	4.00	1.50
Consolidg bf bedding	cy	190	5.50	2.50
Concrete in structures	cy	40	125.00	90.00
Steel sleeves, nozzles, & covers, f&i	lb	1,800	$1.40	$1.30
Air valve assembly, f&i	ls	job	580.00	900.00
Misc metalwork, for 36" conc pipe line, f&i	lb	1,000	0.98	0.60
Non-cylinder conc pipe, symbol A36NC75, f&i	lf	1,620	26.50	25.00
symbol B36NC75, f&i	lf	300	28.50	25.00
Tee-pipe section, f&i	ls	job	1,700	1,300
Steel pipe diversn sect, diversn & care of flow	ls	job	2,500	2,000
Excav roadway, Eden Hwy, first 100,000 cy	cy	100,000	0.52	0.70
over 100,000 cy	cy	100,000	0.51	0.60
Huntsville Hwy, first 150,000 cy	cy	150,000	0.41	0.70
over 150,000 cy	cy	153,000	0.40	0.60
Roadway embank watering	Mgal	4,880	2.00	1.00
rolling	rhrs	800	10.00	8.00
Overhaul of excav for rdwy	stacy	944,000	0.03	0.015
Excav for roadway structures	cy	6,900	1.60	1.50
Bf for roadway structs	cy	2,150	2.60	0.60
Compacting	cy	2,150	4.50	2.40
Fill exist rdwy struct	cy	600	9.00	3.00
Crushed-rock or gravel blanket under roadway riprap	cy	680	6.00	2.50
Riprap for roadway	cy	2,050	1.60	3.00
Remov conc, exist rdwy struct	cy	8	32.00	10.00
Remov exist 18" ϕ CMP culv	lf	264	2.50	1.50
30" ϕ	lf	110	3.00	2.50
60" ϕ	lf	10	10.00	6.00
Remov exist guardrail & guideposts	ls	job	1,000	3,000
Remov & salv chlor plant	ls	job	850.00	1,300
CM Pipe, No. 16 ga, 18" f&i	lf	8	5.00	4.50
No 14 ga, 24" f&i	lf	797	7.00	6.00
No 14 ga, 30" f&i	lf	126	9.00	8.00
No 10 ga, 60" f&i	lf	135	31.00	29.00
Multiple-plate, CMP with paved invert, 156" ϕ No 1 ga, f&e	lf	196	170.00	155.00
CM embankment protectors, No 14 ga, 24" ϕ, f&p	lf	206	8.50	6.50
Anchors for embankment protertors, f&i	ea	10	28.00	17.00
Cast-iron pipe, 16" ϕ, f&i	lf	275	15.00	19.00
Beam-type guardrail, f&e	lf	4,314	4.50	3.50
Guideposts, f&s	ea	158	8.00	11.00
Conc rdw drainage structs	cy	87	80.00	82.00
Crusher-run subbase	t	18,000	1.08	1.90
Crusher-run base	t	7,000	1.15	2.10
Liquid asph prime coat	t	70	42.00	45.00
Min aggr, bitum surf	t	5,000	1.22	2.20
Liquid asph, bitum surf	t	240	42.00	45.00
Stone chips for seal coat	t	460	6.50	4.00
Liquid asph for seal coat	t	38	44.00	45.00

*f	furnish	*c	construct	*ip	in place
*e	erect	*h	handle	*p	place
*i	install	*l	lay	*s	set
				*bf	backfill

Performance schedule & liquidated damages

Section of work	Option	Time Allowed	LDam /Day
1 Spillway constr, upstream	A	7-15-55/2-29-56	none
	B	7-1-56/2-28-57	none
2 downstream	A	7-15-55/2-29-56	none
	B	7-1-56/2-28-57	none
3 Install radial gates	A	1-1 to 4-30 '56	$100
	B	7-1-56/4-30-57	100
4 Place embank matl in dam	A	7-15-55/3-31-56	none
	B	7-15-55/3-31-57	none
5 Install 72" outlet branch	A	3-24 to 3-31 '56	$400
	B	same '57	400
6 Modify wells	A	11-1-55/1-31-56	200
	B	11-1-56/1-31-57	200
7 Constr & test 36" conc pipe	C	3-15 to 4-25 '56	100
	D	10-20 to 12-1 '56	100
	E	3-15 to 4-25 '57	100
8 Install 60" stl pipe, gate, 42" stl pipe & butterfly valve & related conc	F	2-1 to 3-20 '56	200
	G	same '57	200
9 All wk to store water in res.		1, 2, or 3 to 5-15-57	200
10 Remainder of work, 800 days		7-15-55/9-30-57	100

Under option A contractor must perform all work under sections 1-6 incl as shown.

Under option B contractor may do section 2 work under performance period A or B and rest of sections 1-6 under performance period B

Waterworks

Hogback Dam to Increase Hartford Water Supply

To create a 6.5 billion gallon reservoir, The Water Bureau of the Metropolitan District, Hartford County, Conn. awarded the $4.2 million Hogback Dam to White Oak Excavators, Inc, low of 11 bidders. Warren A. Gontner is deputy manager and chief engineer. William Dorenbaum is chief designing engineer.

The damsite is in the towns of Hartland and Colebrook on the West Branch of the Farmington River. Work includes construction of an earth and rock fill dam about 800 ft long and 135 ft high with concrete diversion conduit, concrete spillway weir and rock channel, gate house, tunnel heading, two miles of road and other related structures.

The District furnishes sluice gates, Diesel engine-generator set and bronze seal and plaque. All other materials and equipment are to be furnished by the contractor.

Work is accessible by highway and is six miles from the railhead.

Bidders include:

1C	White Oak Excavators, Inc., Plainville, Conn	$4,223,464
2	Peter W. Kero, Inc., Carlstadt, N. J	4,252,537
11	Yonkers Contracting Co., Inc., Yonkers, N. Y	5,788,863
EE	Metropolitan Dist., Hartford County, Conn	5,614,756

Time schedule: work started immediately after award of contract and must be completed by May 1, 1958. Liquidated damages are $500 per calendar day.

Bids: 7-6-55 Items	Unit	Quantity	Unit Prices 1C	 2
Clear and grub	acre	45	$750	$300
Stream control	ls	job	75,000	67,500
Rem suspension bridge	ls	job	1,000	500
Excavation, earth	cy	185,000	0.65	0.65
Rock	cy	440,000	2.30	1.90
Rock for tunnel head	cy	2,050	25.00	45.00
Rock fill	cy	175,000	0.60	0.25
mixed with earth	cy	19,000	1.00	0.25
Riprap, light	cy	17,000	5.00	4.00
heavy	cy	12,000	4.00	0.50
Earth fill	cy	53,000	0.50	0.20
Soil core	cy	89,000	1.25	1.00
Coarse gravel, 1/4"-4"	cy	21,000	2.00	2.00
1/4"-2"	cy	11,000	2.10	2.00
Sandy gravel, 4" max	cy	175,000	1.35	2.00
2" max	cy	8,500	1.75	2.00
Sand with little grav	cy	78,000	1.15	1.50
Topsoil, dressg & seed	cy	10,250	2.10	2.50
Seeding & mulch	sy	31,000	0.12	0.25
Drill holes rock & mas for grout & drains	lf	12,500	2.00	3.00
for anchors	lf	7,500	3.00	3.00

Continued on following page

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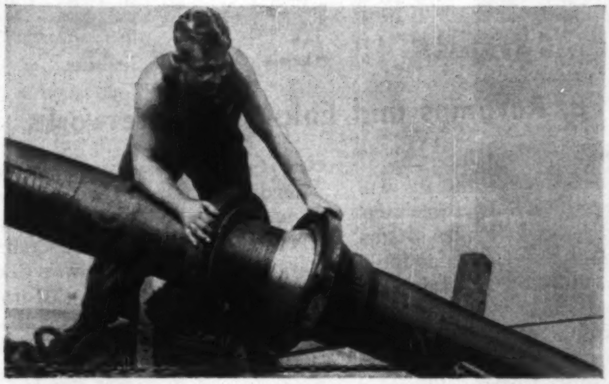

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ONLY A RATCHET WRENCH NEEDED. No split parts. Fewer parts—each joint consisting of one complete pipe, one solid follower ring, one solid ring gasket, bolts and nuts.

FULL 15° TURNING DEFLECTION with absolutely no reduction in the full internal opening area—therefore, no abnormal pressure-drops at deflected joints. Deflection stresses evenly distributed among all the bolts.

LONGER LAYING LENGTHS—approximately 18'6"—faster installation, lower costs. However, lengths may be varied to suit conditions. For example: 6 foot, 12 foot or other special lengths may be advisable to suit required curvature.

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SOLENOID
VALVES
WHICH CAN BE
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LIKE THIS

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✓ Positive Control
✓ Sizes ½″ thru 36″
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TECHNICAL FACTS
WRITE FOR IT TODAY

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Valve Specialty Company
1208 RIDGE AVE., PITTSBURGH 33, PA.
Designers and Manufacturers of
VALVES FOR AUTOMATION

Hogback Dam, Connecticut

Continued from preceding page

Bids: 7-6-55 Items	Unit	Quantity	Unit Prices 1C	 2
Drain hole outlets	lf	175	5.00	2.00
Connectns for groutg	ea	1,000	2.50	10.00
Grout, f & p	cy	500	16.00	35.00
Portland cement for	bbl	2,000	5.00	6.00
Sand for	cy	150	5.00	7.00
Gunite	sy	5,600	4.50	4.00
Conc pipe, 8″	lf	2,700	3.50	2.00
10″	lf	1,700	4.25	2.50
RCP, 12″	lf	650	5.75	4.00
24″ & 30″	lf	700	10.00	10.00
36″ & 48″	lf	280	18.00	20.00
CIP, 2″ through 6″	lf	610	3.70	10.00
8″	lf	330	4.50	15.00
12″ through 24″	lf	165	13.20	50.00
4″ water line	lf	1,375	5.00	8.00
WIP, 1″ through 2″	lf	1,250	2.85	2.00
3″ through 8″	lf	1,300	5.00	10.00
Copr tubg & brass pipe	lf	165	5.50	5.00
Conc masnry, for tunl hd	cy	1,060	75.00	40.00
3,500-lb	cy	9,350	45.00	40.00
3,000-lb	cy	11,170	42.00	35.00
2,500-lb	cy	4,650	20.00	25.00
Granite, ashlar facing	sf	10,900	14.00	20.00
rubble facing	sf	18,430	5.75	9.50
capstones	sf	5,790	9.50	15.00
curbing, laid dry	lf	1,590	7.50	7.50
laid in mortar	lf	840	8.00	8.00
Native stone facing	sf	5,730	4.50	11.00
Stone paving	cy	720	10.00	20.00
Bluestn flag'g laid in mortar, 1″ & 2″	sf	1,560	3.25	2.30
on sand bed, 4″	sf	6,850	5.00	5.50

Bids: 7-6-55 Items	Unit	Quantity	Unit Prices 1 C	 2
Steel, reinforcing	lb	1,050,000	0.11	0.
structural	lb	79,000	0.20	0.2
Steel & iron, misc	lb	333,500	0.35	0.3
Copr, brs, brnz & alumn	lb	32,000	1.00	1.5
Wire rope railing	lf	2,400	1.40	1.2
Anchorages	ea	16	50.00	33.
Posts, single	ea	16	6.50	7.
Fence, rustic wood	lf	230	6.00	3.5
stock wire	lf	1,025	0.65	0.5
Road boulders	ea	330	10.00	10.
Bit Macadam paving	sy	27,300	1.50	0.6
Processed gravel	cy	7,200	3.00	3.5
Bitum surface treatment	sy	10,500	0.35	[illegible]
Bitum concrete	cf	830	1.00	1.3
Catch basins	ea	42	150.00	250.
Access road gates	ls	job	4,000	2,50
Glass block windows	ls	job	2,500	3,50
Hollow tile	ls	job	1,500	4,00
Corkwood insulation	ls	job	4,500	2,00
Brick masonry	ls	job	7,500	10,00
Tar & gravel roofing	ls	job	1,000	1,[illegible]
Wood door	ls	job	2,500	50
Partitions	ls	job	500	50
Instalg sluice gates	ls	job	5,000	15,00
Stop logs & lifter	ls	job	15,000	20,00
Transite conduits, 2″ & 4″	lf	3,600	1.25	2.
Electrical work	ls	job	25,000	50,00
Plumbing work	ls	job	1,000	5,00
Painting	ls	job	5,000	15,00
Asphalt waterprfg, 1/16″	sf	12,300	0.08	0.2
1/8″	sf	40,500	0.12	0.2
Misc equip, f & i	ls	job	10,000	20,00
install	ls	job	2,500	5,00
Bronze plaq & seal, i	ls	job	500	50
Cleaning up	ls	job	25,000	5,00

*f furnish   *p place   *i install

Altoona, Pa. Revamps and Enlarges Waterworks

In five contracts totalling $2.37 million Altoona City Authority will repair two reservoirs, erect three steel elevated water tanks, lay miles of supply and distribution mains and build a new dam and reservoir. Lewis L. Gwin, Altoona, and Albright & Friel, Inc., Philadelphia, are consultants, with the former handling the bids on the reservoirs, tanks, and pipelines and the latter the bids on the new dam and reservoir and the electrical work.

Work includes guniting Prospect and Super High Reservoirs, foundations for three steel tanks, $138,994; furnishing and erecting tanks, $32,930; transmission and distribution lines, with alternate bids, on some 16,500 lin ft of 8-in asbestos-cement or CI roll-on joint pipe and 57,500 lin ft of 10-in, 12-in, 16-in, 20-in and 24-in CI mechanical joint pipe with related work including repaving over pipe trenches, $1,015,447.

One alternate was accepted on these pipelines which means that all lines 10-in to 20-in will be cement lined, mechanical joint cast iron. All lines under 10-in will be asbestos cement, and the 24-in line will be prestressed concrete. Quantities include 15,000 lin ft of 8″ asbestos cement, 1,800 lin ft of 10″ cement lined CIMJ, 27,700 lin ft of 12″, 7,750 lin ft of 16″ and 5,450 lin ft of 20″ cement lined CIMJ, 10,800 lin ft of 24″ prestressed concrete pipe. Cast iron pipe is ASA-A21.6 and/or A21.8-1953, AWWA C-106-53.

Mill Run Dam and Reservoir construction will run $1,176,320 plus electrical work, $8,517, which includes some work at Prospect Hill Reservoir. This is an earth dam with capacity of 876 million gallons and yield o 3 mgd. Its crest is 1,200 ft long an its maximum height is 90 ft, its slop is 1:3. Work includes concrete spill way, concrete lined spillway discharg channel, concrete intake, cast iron out let pipe, meter house, access road an related construction. Class A concret must test at 3,750 psi and Class B a 3,250 psi. Cast iron pipe is Fed Spe WWP421, pipe Cl 150, fittings Cl D.

The bidders on each contract in clude:

Reconstruct Reservoirs
Construct Foundations for Tanks

1C	Payne-Oliver Concrete Co., Falls Church, Va.	$138,99
2	Altoona Plumbing, Heating & Ventilating Co.	140,27
8	Cement Gun Co., Inc, Allentown, Pa.	172,13

Prospect Park

Bids: 8-3-55 Items	Unit	Quantity	Unit Prices 1C	 2
Excav & backfill	ls	job	$4,662	$6,00
Tank foundation ... ip	ls	job	*3,954	*2,70
Valve chamber ... ip	ls	job	2,208	2,80
Recondition valve house	ls	job	3,082	2,10
CIP, fittings, valves ... ip	ls	job	16,093	22,74
Pressure mortar, inside vlv hs	bag	195	12.70	7.3
On bottom of reservoir	bag	5,430	6.00	7.3
Inside walls of reservoir	bag	4,050	8.00	7.3
Outside walls of reservoir	bag	1,540	11.65	7.3
Chain link fence	ls	job	4,261	3,53
Copper water stop	lf	600	1.62	1.0

* for 56′ φ, 300,000-gal steel tank   ip complete in plac

Super High Reservoir

Items	Unit	Quantity	1C	2
Excav & backfill	ls	job	$538	$1,60
Tank foundation ... ip	ls	job	*2,685	*2,20
CIP, fittings & valves ... ip	ls	job	1,630	1,72
Pressure mortar inside res	bag	520	8.55	9.45
Chain link fence	ls	job	828	1,62
Copper water stop	lf	100	1.62	1.00

* for 50′ φ, 300,000-gal steel tank

Tank Foundation, Valve Pit at Sylvan Hills

Items	Unit	Quantity	1C	2
Excav & backfill	ls	job	$753	$300
Tank foundation ... ip	ls	job	*1,985	*1,800
CIP, fittings and valves ... ip	ls	job	4,060	1,515
Chain link fence ... ip	ls	job	1,277	2,163

* for 26′ φ, 100,000-gal steel tank

Completion time: 346 days-1C, not given-2

Furnish and Erect Steel Tank

1C	Chicago Bridge & Iron Co., Pittsburgh, Pa.	$32,930
2	Risher Tank Co., Chester, Pa.	35,160
6	Pittsburgh Des Moines Co, Pittsburgh, Pa.	43,960

Bid Date: 8-3-55		Quan-	Unit Prices	
Items	Unit	tity	1C	2
56-ft diam, 300,000-gal tank	ls	1	$13,900	$14,995
50-ft diam, 300,000-gal tank	ls	1	11,990	12,995
26-ft diam, 100,000-gal tank	ls	1	7,040	7,170
Completion time: days...			172	210

Water mains, incl. earth excav. & backfill

1C	Intercounty Construction Corp., Hyattsville, Md.	$1,015,447
2	New Enterprise Stone & Lime Co., Inc., New Enterprise, Pa.	1,035,428
EE	Lewis L. Gwin, Altoona, Pa.	1,147,958

Main feeder

Bids: 8-3-55		Quan-	Unit Prices	
Items	Unit	tity	1C	2
Cmt lined CIP 20" ϕ up to 6' deep	lf	2,906	$16.50	$14,50
20" pipe, 6'-8' deep	lf	70	1.40	15.30
Excav, rock trenches	cy	400	15.00	3.00
Gate valves & vlv bxs, 20"	ea	4	820.00	1,100
Crossings, RR at 23rd St.	ls	job	5,750	7,200
Air release vlv & MH 1"	ea	1	370.00	300.00
Perm repav over 20" pipe 9" conc	lf	2,906	4.65	4.10
1½" bit on 7" conc base	lf	1,562	4.60	4.25
Fittings for all piping	ls	job	1,100	2,100
Shoring, lip	Mbm	1	115.00	150.00
Pipe crdl&pltfrm, wood lip	Mbm	1	170.00	150.00
Concrete, cl C	cy	50	30.00	40.00
Addl cost, substitut std gate vlv MH for vlv box	ea	1	*660.00	*300.00

Water distribution mains

Cmt lin CIP				
12" ϕ up to 6' deep	lf	7,202	10.60	8.00
12" ϕ 6' to 8' deep	lf	100	2.40	8.60
Excav for rock trenches	cy	300	18.00	3.00
Tap sleeve & gate vlv & vlv box,				
12" x 12"	ea	1	480.00	350.00
6" x 6"	ea	3	180.00	130.00
Gate vlvs & boxes, 12"	ea	25	215.00	207.50
6"	ea	1	95.00	75.00
4"	ea	1	67.00	54.00
2"	ea	2	45.00	34.00
Xing under storm sewer	ls	job	590.00	1,000
utilities	ls	job	450.00	3,500
Perm repav, 9" conc, 12" pipe	lf	658	5.20	3.50
2¼" ID 12" pipe stone block replaced by 8" stone base	lf	2,670	2.80	2.50
8" stone base	lf	2,284	2.70	2.50
Conc sdwlk 4", 5' wide, 12" pipe	lf	595	3.75	2.50
Fittings for all piping	ls	job	1,950	800.00
Fire hyd compl 5", 3-way, 5'	ea	6	300.00	450.00
Shoring lip	Mbm	2.5	105.00	150.00
Pipe crdl or platfrm, wood lip	Mbm	2.5	160.00	150.00
Concrete, cl C	cy	75	30.00	40.00
Service taps&runs, 10' aver, 2"	ea	2	175.00	60.00
¾"	ea	62	65.00	31.00
Cmt lined CI mech jt, 12" pipe, up to 6'	lf	8,207	7.60	8.00
Xtra pay ea exc&bf 12" pipe 6' to 8' deep	lf	300	1.10	8.60
Excav for rock trenches	cy	100	15.00	3.00
Gate vlvs & boxes: 12"	ea	19	215.00	210.00
Xings 58th St. bridge	ls	job	725.00	1,500
Under Plank Road	ls	job	1,219	3,000
Under road drain	ls	job	115.00	700.00
Perm repav 2¼" ID bit surf for 12" pipe, 8" stone base	lf	2,040	2.70	2.50
Fittings for all piping	ls	job	2,530	725.00
Fire hyd compl 5", 3-way, 5'	ea	9	300.00	50.00
Shoring, lip	Mbm	2	100.00	150.00
Cradles or platforms	Mbm	2	150.00	150.00
Concrete, uncl cl C	cy	100	30.00	40.00
Servc ln, ¾" tap, aver 15' run	ea	11	85.00	50.00
Blow-off branch, 12" x 4"	ls	job	215.00	250.00
Cmt lined CI mech jt pipe up to				
6' deep 12" CIP Cl 22	lf	8,233	8.00	8.00
Cl 23	lf	1,737	8.30	8.20
8" CIP Cl 22	lf	697	4.80	5.40
Cl 23	lf	564	5.00	5.50
8" asb cmt pipe	lf	3,625	4.40	4.70
6" CIP Cl 22	lf	20	4.00	4.50
4" CIP Cl 22	lf	20	3.50	3.90
Xtra pay for ea exc&bf 12" pipe				
6' to 8' deep	lf	750	0.70	8.40
8' to 10' deep	lf	100	1.80	8.90
8" pipe, 6' to 8' deep	lf	200	0.70	5.00
8' to 10' deep	lf	200	1.20	5.40
10' to 12' deep	lf	200	2.30	6.00
Excav for rock trenches	cy	400	18.00	3.00
Tap slv, vlv & vlv box				
8" x 8"	ea	1	300.00	200.00
6" x 6"	ea	1	230.00	150.00
Gate vlvs & boxes: 12"	ea	14	215.00	225.00
8"	ea	9	120.00	125.00

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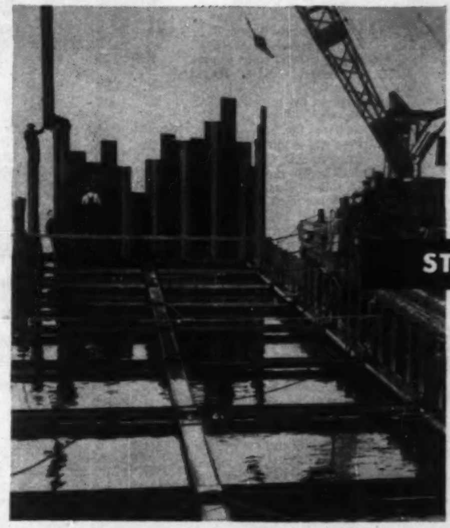
Foster's Rental Piling



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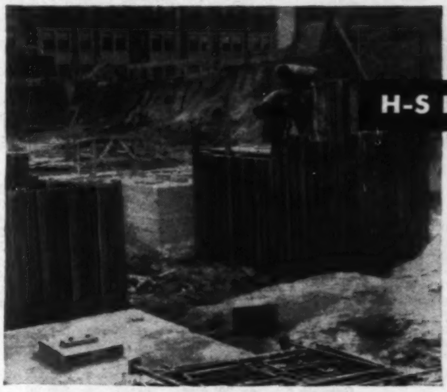

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CHICAGO 4, ILL. • HOUSTON 2, TEX. • LOS ANGELES 5, CAL.

Altoona Waterworks

Continued from preceding page

Bids: 8-3-55 Items	Unit	Quan-tity	Unit Prices 1C	2
Xing Brush Run	ls	job	2,000	2,500
Air release vlv & MH, ¾"	ea	2	260.00	300.00
Perm repav, 12" pipe, 8" conc	lf	2,575	5.70	3.50
6" stn base, 1½" ID bit surf	lf	125	2.40	2.20
8" pipe, 9" stn base, 2¼" ID bit surf	lf	1,760	2.10	2.30
Fittings for all piping	ls	job	3,400	2,500
Fire hyd, 5", 3-way, new	ea	9	440.00	450.00
5", 3-way, reset	ea	2	80.00	250.00
Shoring, lip	Mbm	2	100.00	150.00
Pipe crdl or pltfrm, wood, lip	Mbm	1	160.00	150.00
Concrete, uncl Cl C	cy	100	30.00	40.00
Service line ¾" taps, 40' runs	ea	99	115.00	120.00
1", 40' runs	ea	8	125.00	150.00
1½", 40' runs	ea	3	175.00	175.00
Blow-off branch, 12" x 6"	ea	1	175.00	276.00
Cl roll-on jt cmt lined dist mains (Fed. Spec. WW-P-421a Tp 2; ASA A21.6; ASA A21.8) incl ea exc & bf up to 6' deep, 8" pipe, alt	lf	4,070	*4.35	*4.70
Asb-cmt pull-on jt up to 6' deep, 8" pipe	lf	2,777	5.00	4.70
2" pipe	lf	40	4.00	3.40
Xtra pay ea exc & bf for 8" pipe, 6' to 8' deep	lf	50	1.70	4.70
Excav for rock trenches	cy	25	16.00	3.00
Tap sleeve, gate vlv&box: 8" x 2"	ea	1	140.00	100.00
Gate vlvs & boxes, 8" pipe	ea	11	120.00	125.00
Perm repav, 8" stone base, 2¼" ID bit surf for 8" pipe	lf	1,290	1.75	2.20
Fittings for all piping	ls	job	740.00	750.00
Fire hyd, 5", 3-way, 5'	ea	4	340.00	425.00
Shoring, lip	Mbm	1	100.00	150.00
Crdls or pltfrms, wood lip	Mbm	1	160.00	150.00
Concrete, uncl cl C	cy	60	30.00	40.00
Service line 2" tap, run 15'	ea	6	180.00	100.00
Cl roll-on jt cmt lined dist mains (Fed. Spec. WW-P-421A- Tp 2; ASA-A21.6; ASA-A21.8), incl ea exc & bf up to 6', 8" pipe alt	lf	2,777	*5.00	*4.70
2" pipe alt	lf	40	*4.00	*3.40
Cmt lined Cl mech jt up to 6' dp				
16" pipe	lf	1,659	11.00	11.50
12" pipe	lf	2,330	7.60	8.00
10" pipe	lf	1,797	6.40	7.00
6" pipe	lf	77	4.60	4.60
Xtra pay ea exc & bf 16" pipe, 6' to 8' deep	lf	120	1.20	12.00
Excav for rock trenches	cy	400	16.00	3.00
Tap sleeve, gate vlv & box, 6" x 6"	ea	1	220.00	150.00
Gate vlve & boxes, 16"	ea	4	520.00	500.00
12"	ea	8	225.00	250.00
10"	ea	8	175.00	200.00
6"	ea	1	90.00	100.00
Xing Spring Run Bridge	ls	job	800.00	1,500
Air release vlv&MH, 1"	ea	1	260.00	350.00
Perm repav, 9" conc, 16" pipe	lf	45	5.50	3.50
10" pipe	lf	846	3.60	3.00
8" stone base, 2¼" ID bit surf				
16" pipe	lf	1,652	3.20	2.50
12" pipe	lf	631	2.20	2.50
10" pipe	lf	483	2.10	2.40
6" pipe	lf	45	2.10	2.40
Fittings for all piping	ls	job	3,200	4,000
Fire hyd 5", 3-way, 5'	ea	5	300.00	450.00
Shoring lip	Mbm	2	100.00	150.00
Crdls or pltfrms, wood, lip	Mbm	2	100.00	150.00
Concrete, uncl Cl C	cy	100	30.00	40.00
Service lines, ¾", 20' runs	ea	12	85.00	75.00
Blow-off branch, 16" x 6"	ls	job	170.00	750.00
Cmt pipe up to 6' deep, 8" pipe	lf	4,462	4.50	5.00
for 6" pipe	lf	71	4.50	4.20
Excav for rock trenches	cy	150	14.00	3.00
Tap sleeve, gate vlv&vlv box, 8" x 8"	ea	1	330.00	200.00
Gate vlvs & road box, 8" pipe	ea	7	120.00	150.00
Air release vlv&MH ¾"	ea	1	260.00	350.00
Perm repav 8" stone base, 2¼" ID bit surf for 8" pipe	lf	785	1.80	2.20
Fittings for all piping	ls	job	460.00	550.00
Fire hyd 5", 3-way, 5'	ea	1	350.00	425.00
Shoring, lip	Mbm	1	100.00	150.00
Cdls or pltfrms, wood lip	Mbm	1	160.00	150.00
Concrete, uncl Cl C	cy	25	30.00	40.00
Servc line, ¾" tap, 20' run	ea	3	75.00	75.00
Cl roll-on jt cmt lined dist mains (Fed. Spec. WW-P-421A Type 2; ASA-A21.6; ASA-A21.8), incl ea exc & bf up to 6' for 8" Pipe alt	lf	4,462	*4.50	*5.00
for 6" Pipe alt	lf	71	*4.50	*4.20
Asb-cmt pull-on jt up to 6' dp 8" pipe	lf	3,918	5.65	5.00
Xtra pay ea exc & bf 8" pipe, 6' to 8' deep	lf	150	1.20	5.40
Excav for rock trenches	cy	120	15.00	3.00
Gate vlvs&vlv boxes, 8"	ea	9	120.00	150.00
Air release vlv & MH ¾"	ea	1	270.00	350.00
Perm repav 9" conc, 8" pipe	lf	29	4.70	3.00
8" stone base, 2¼" ID bit surf	lf	2,088	1.80	2.20
Fittings for all piping	ls	job	1,370	750.00
Fire hyd, 5", 3-way—5'	ea	2	310.00	425.00
Shoring, lip	Mbm	1	100.00	150.00
Pipe crdl or pltfrm, wood lip	Mbm	1	160.00	150.00
Conc uncl Cl C	cy	20	30.00	40.00
Serv ln ¾" tap, av 16' run	ea	6	70.00	75.00
Cl roll-on jt cmt lined dist Mains (Fed. Spec. WW-P-421a Type 2; ASA-A21.6; ASA A21.8) incl ea exc & bf up to 6' 8" pipe	lf	3,918	*5.60	*5.00
Cl cmt lined incl ea exc & bf up to 6' deep, 16" pipe	lf	4,133	16.00	16.10
Xtra pay ea exc & bf, 6' to 8' deep	lf	250	2.25	18.20
Tap sleeve & gate vlv & vlv bx				
16" x 12"	ea	1	710.00	400.00
16" x 16"	ea	1	1,100	800.00
Gate vlvs & boxes: 16"	ea	8	510.00	525.00
Xing under utilities	ls	job	270.00	2,500
Perm repav 9" conc, 16" pipe	lf	1,225	4.60	3.50
2¼" ID bit surf for 16" pipe,				
8" conc base	lf	1,065	4.70	3.80
8" stone base	lf	1,303	2.60	2.50
Fittings for all piping	ls	job	3,400	3,000
Fire hyd 5", 3-way, 5'	ea	5	400.00	500.00
Shoring, lip	Mbm	5	100.00	150.00
Pipe crdls or pltfrms, wood lip	Mbm	3	160.00	150.00
Concrete, uncl Cl C	cy	50	30.00	40.00

Water transmission mains

Items	Unit	Quantity	1C	2
Cmt lined Cl mech jt up to 6', 16" pipe	lf	1,947	10.20	11.50
Xtra pay ea exc & bf, 16" pipe, 6' to 8' deep	lf	50	1.10	12.00
Tap sleeve, gate vlv & vlv box: 16" x 16"	ea	1	1,080	750.00
Gate valve & box: 16"	ea	4	500.00	500.00
Xings Mill Run Stream	ls	job	1,120	4,000
Fittings for all piping	ls	job	1,150	2,500
Shoring, lip	Mbm	1	100.00	150.00
Pipe crdls or pltfrms, lip	Mbm	1	160.00	150.00
Concrete, uncl Cl C	cy	5	30.00	40.00
Cmt lined Cl mech jt 20" pipe up to 6' deep	lf	2,551	15.30	14.50
Xtra pay for ea exc & bf for 20" pipe, 6' to 8' deep	lf	100	1.10	15.50
Excavation rock	cy	50	18.00	3.00
Tap sleeve, gate vlv&box 24" x 20"	ea	1	2,000	1,800
Gate vlv & boxes, 20" pipe	ea	5	800.00	1,400
20" by-pass	ea	1	910.00	1,500
Perm repav, 9" conc, 20" pipe	lf	48	5.50	4.00
8" stone base, 2¼" ID bit surf, for 20" pipe	lf	2,368	2.60	3.00
Fittings for all piping	ls	job	1,900	5,500
Crdls or pltfrms, lip	Mbm	2	155.00	150.00
Concrete, uncl Cl B	cy	100	30.00	40.00
Pres control chamber, incl piping, fittings & vlvs	ls	job	14,600	18,500
Blow-off branch 20" x 6"	ls	job	400.00	500.00
Cmt lined Cl mech jt 24" pipe, up to 6' deep	lf	10,768	18.15	20.50
Xtra pay for ea exc & bf 24" pipe, 6' to 8' deep	lf	60	2.75	21.00
Excav for rock trenches	cy	100	14.00	3.00
Gate vlvs&boxes, 12" conn at Present Mill Run Dam, 12"	ea	1	714.00	750.00
24" by-pass vlv&MH chamber, no valve box	ea	9	1,770	1,600
Xings, thru RR culv	ls	job	835.00	10,500
Stream	ls	job	1,160	3,400
Perm repav, 8" stone base, 2¼" ID bit surf	lf	3,625	2.40	3.00
Fittings for all piping	ls	job	8,600	5,500
Shoring, lip	Mbm	3	100.00	150.00
Pipe crdls or pltfrms, lip	Mbm	2	155.00	150.00
Concrete, uncl Cl C	cy	200	30.00	40.00
Vacuum release vlv&MH	ea	1	250.00	400.00
Blow-off branch, 24" x 8"	ea	1	475.00	350.00
Monument markers lp	ea	6	35.00	15.00
Prestressed conc pipe, AWWA Spec C301-52, 24" pipe, up to 6' deep alt	lf	10,768	*14.25	*17.00

• bf backfill • lip left in place * alternate

Mill Run Dam & Reservoir

1C	Sanctis Construction, Inc., Pittsburgh, Pa.	$1,176,320
2	Lycoming Constr Co., Inc., Williamsport, Pa.	1,192,237
14	Joint Venture, N. R. Corbisello Inc. & Triple Cities Constr Co., Binghamton, N. Y.	3,152,940
EE	Albright & Friel, Inc., Philadelphia, Pa.	1,487,210

Bids: 8-3-55 Items	Unit	Quan-tity	Unit Prices 1C	2
Care & diver of stream	ls	job	$7,000	$15,500
Clear grub, borrow area	acre	34	410.00	650.00
Dam site & spillway	acre	18	500.00	650.00
Reservoir area	acre	115	410.00	550.00
Excav, unclassified				
Strip borrow area & dam site	cy	53,000	0.45	0.70
Cutoff trench, drains & rock toe trench	cy	21,000	0.50	1.10
Intake & outlet wks incl meter house	cy	17,250	0.85	1.50
Splwy & rdwy to intake	cy	116,500	0.80	1.00
Borrow area incl haul to dam	cy	347,000	0.43	0.44
Access rds & culv	cy	9,000	0.45	0.55
Line drilling	sf	4,000	1.50	1.50
Rolled-fill embankment				
from borrow area	cy	315,000	0.25	0.20
from spillway excav	cy	120,000	0.15	0.15
Sand filters & drains in embankment	cy	15,500	6.00	6.05
Dumped riprap	cy	16,600	5.05	2.90
Rock fill in toe trench	cy	8,000	5.05	2.80
Addl rolling, embank, 5 million sf, 1 pass	ls	job	4,000	500
Backfill, spillway	cy	4,050	0.45	1.00
Outlet wks, compact along pipe encase	cy	1,800	2.85	1.15
Structural along 42" pipe & meter house	cy	1,800	2.85	1.70
Conc intake structure	cy	250	65.00	55.00
Outlet pipe encase	cy	500	32.00	37.50
Meter house, chan pav, pipe anchors etc	cy	40	65.00	70.00
Spillway weir, pier & spillway bucket	cy	1,700	45.00	38.00
Spillway walls & ftgs	cy	1,420	42.00	42.00
Spillway floor slab	cy	570	32.00	30.00
Bridge flr, culv end walls	cy	55	80.00	90.00
Gunite	sf	1,800	2.00	2.30
Spillway, under drains incl excav, sand fill & 6"VCP	lf	704	2.75	1.70
Sand &/or gravel wall & weir drains	cy	40	25.00	10.00
Black steel grout pipe	lb	900	1.50	0.30
Wlpipe, wall & floor drains	lb	500	3.00	0.40
Drill grout holes, in overburden	lf	2,500	3.15	3.60
rock	lf	1,810	3.50	4.00
Cement grout	cf	7,000	3.60	4.10
Reinforcing steel	lb	135,000	0.13	0.14
CIP 42" φ CIB	lf	1,030	63.00	68.00
CIP for meter house & connect incl valves, venturi tubes recorders, couplings	ls	job	17,650	14,500
Meter house above elev	ls	job	3,000	5,800
Copper water stops	lb	2,800	1.85	1.25
Sh cork jt fill #514, ¼"	sf	1,800	0.45	1.00
Sluice gate & oper stand, 36" x 48"	ea	1	5,600	6,100
30" φ	ea	4	2,500	2,300
Cl gatevalve & oper stand, 30" φ	ea	4	3,000	2,900
Cl gate valve geared, handwheel, 42" φ	ea	1	6,000	6,000
Cl wall castings, 30"	lb	8,000	0.50	0.35
Struct steel spillway bridge	lb	28,000	0.30	0.20
Floor grating	sf	360	3.20	5.00
Chain link fencing	lf	41	5.00	10.00
Misc metal, see MM	lb	13,000	0.45	0.55
Air compressors, bubbler piping, compressor housing	ls	job	1,800	2,800
Conc culv pipe, fl&bf,				
18" φ	lf	30	8.00	8.00
24" φ	lf	30	10.00	12.00
30" φ	lf	30	14.00	14.00
Surf roads, parkg areas	sy	8,700	3.85	3.25
Highway guard fence, P.D.H. type 1C	lf	3,900	1.94	1.75
Railing on splwy bridge	lf	168	8.00	10.00
Splwy flow meter & hsg	ls	job	1,222	3,000
Meter house heater & 550 gal tank	ls	job	1,245	1,250
Plumbing, incl floor drain, lavatory & water supply, waste & sewer	ls	job	500.00	800.00
Chlorinating apparatus	ls	job	13,850	14,000
Ventilating fan & duct	ls	job	1,000	900.00

• f furnish • l install • bf backfill

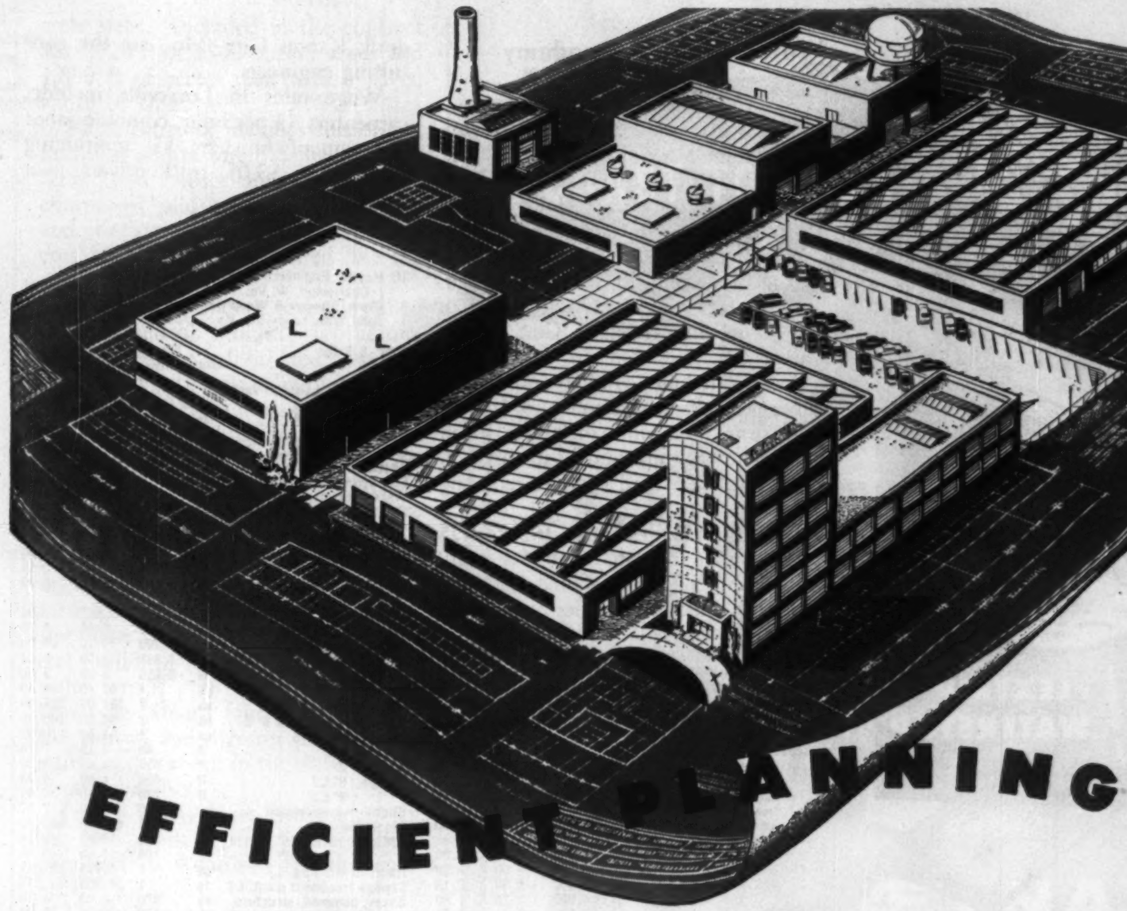
• MM incl trash racks, screens, screen guides & supports, hoists & frames, ladders, stem guide supports, deck framing, wall castings, etc.

Completion time: 444 calendar days

Potable Water Supply for Air Force Academy, Colo.

The first contract to provide water for the Air Force Academy, 12 miles north of Colorado Springs, is for $399,235 awarded to Wade Lahar Construction Co. of Tulsa for constructing 38,600 lin ft of supply lines

Continued on following page



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Water for A F Academy

Continued from preceding page

from the Colorado Springs 24-in supply line on West Monument Creek. Work is for the Air Force Academy Construction Agency, Major T. E. Correll, USAF, contracting officer and assistant chief of staff, installations. Skidmore, Owings & Merrill, Chicago, are architect-engineers, Robert & Co. Associates, Inc., Atlanta, Ga., are engineers.

Work includes 400 ft of tunnel through rock, excavation and trenching, furnishing and installing 12-in and 16-in steel pipe and 12-in cast iron pipe, gate valves and pressure reducing valves.

Minimum wages range from $1.75 for common labor to $1.90 for semiskilled and $2.50 for skilled trades.

Eleven bidders include:

1C	Wade Lahar Construction Co., Tulsa, Okla	$399,235
2	Brodie Construction Co., Amarillo, Tex	417,294
11	A & A Construction Co., Muskogee, Okla	847,902

Bids: 7-1-55 Items	Unit	Quantity	Unit Prices 1C	 2
Tunnel, portal exc, open cut	lf	45	$50.00	$25.00
Exc, unclass	cy	775	35.00	45.00
Timber, incl portals..lp	Mbf	18	450.00	300.00
Exc, rock in trench & structs	cy	5,000	5.00	5.00
Steel water pipe, 16", 3/16"	lf	5,000	12.40	10.00
1/4" wall thickness	lf	1,120	13.00	11.20
12" pipe, 3/16" wall	lf	17,600	6.80	7.15
1/4" wall	lf	4,950	7.75	7.80
8" pipe, 3/16" wall	lf	600	5.15	5.50
CI pipe, Cl 150, 12"	lf	1,000	6.55	7.50
Cl 250, 12"	lf	2,850	7.05	8.30
Gate valve & box				
16" with by-pass, Cl 250	ea	2	1,250	1,500
12", Cl 150	ea	8	250.00	410.00
Cl 250	ea	6	300.00	640.00
8", Cl 150	ea	3	150.00	185.00
Cl 250	ea	3	200.00	370.00
Air vacuum relief vlv incl MH	ea	11	275.00	450.00
4" blow-off valve assemb Cl 250	ea	12	100.00	150.00
4" CI blow-off pipe, Cl 250	lf	800	3.00	5.00
8" pressure reducing valve	ea	3	750.00	650.00
Conc, PC, blockg, piers, anchor	cy	680	50.00	70.00
Steel, reinf	lb	22,000	0.20	0.25
Pipe slope anchors	set	80	150.00	25.00
Sheeting & shoring, lip	Mbm	10	200.00	250.00
Testing pipe	ls	job	1,000	1,500
Xtra 12" steel pipe & coupl, 3/16" wall.....f	lf	400	4.00	7.15
Concrete monuments	ea	120	10.00	25.00

• f furnish • lip left in place

Sewerage

Water Supply and Sewage Disposal, Kentucky Turnpike

Water supply and sewerage facilities for Lebanon Junction and Shepherdsville service areas, Kentucky Turnpike from Louisville to Elizabethtown will be built by Hayne Engineering Co., Charleston, W. Va., the low bidder at $323,991. This award is on the alternate using poured concrete construction of sewage pumping station rather than the concrete pipe design. D. H. Bray, state highway engineer is in charge of the turnpike construction. Howard, Needles, Tammen & Bergendorff, Kansas City, Mo., are the consulting engineers.

Wage rates in Louisville include: carpenters $3 per hour, common labor $2, cement finishers $3, reinforcing ironworkers $3.05, truck drivers, over 1½-ton $2.26.

Bidders include:

1C	Hayne Engineering Co & Andersons' Inc., Charleston, W. Va.	$323,991
2	Clark, Stewart & Wood Co., Lexington, Ky	373,518
4	John Wile, Louisville, Ky	391,865

Bids: 8-5-55 Items	Unit	Quantity	Unit Prices 1C	 2
Wells, water, Lebanon Junction	ea	2	$4,094	$5,335
CI pipe, 3" Cl 150 LJ	lf	1,400	3.20	3.30
6"	lf	875	4.00	4.20
Gate-road box, 3" LJ	ea	2	73.00	70.00
Check valve, 3" LJ	ea	2	73.00	59.00
Fire hydrant, 4" LJ	ea	2	151.00	227.00
Water treatment plant, LJ.	ls	1	42,741	47,213
Direct burial cable, 3#250 MCM & 1#4 AWG, LJ	lf	2,600	5.10	5.50
4#8 AWG, LJ	lf	540	2.55	2.55
Cl A concrete	cy	5	62.50	34.00
Cl D CI fittings LJ	lb	550	0.50	0.54
Steel, reinforcing	lb	500	0.16	0.19
Vert turbine water pump, Shepvl	ea	1	2,087	4,954
Excav, common, structure	cy	80	3.65	3.75
solid rock, structure	cy	200	16.70	25.00
Cl D CI fittings, S	lb	1,650	0.50	0.54
CI pipe, Cl 150 6" S	lf	8,855	4.00	4.00
Valves, air relief S	ea	4	67.50	192.50
Fire hydrants, 4" S	ea	2	151.00	227.50
Gate valve with box 6" S	ea	1	94.50	100.00
Check valve, 6" S	ea	1	94.50	110.00
VC pipe. 6"	lf	40	3.15	7.73
8"	lf	5,650	3.25	3.20
Ci pipe, 6" LJ	lf	400	4.00	4.23
8" LJ	lf	230	5.40	6.41
Bituminous pavement	sy	170	6.20	7.37
Manholes	ea	13	416.00	500.00
CM pipe, casing 15"	lf	304	15.65	8.24
12"	lf	106	15.65	5.63
Railroad crossing, LJ	ea	1	1,725	3,689
Sewage treatment plant, LJ	ls	1	56,808	74,758
Excav, common, structure	cy	970	3.65	3.75
Solid rock, structure	cy	170	16.70	25.00
Concrete, Cl A	cy	10	62.50	34.00
Steel, reinforcing	lb	700	0.16	0.19
CI pipe, Cl 150 4" S	lf	2,300	3.30	3.13
Sewage treatment plant, S.	ls	1	58,153	76,923
Borrow	cy	300	3.65	3.75
Direct burial cable, 3#1 AWG & 1#8 AWG S.	lf	580	3.25	3.03
3#2 AWG & 1#8 AWG S.	lf	1,440	3.05	2.48
Elev. steel water tank, 40 M gal	ls	1	22,700	22,561
Sewage pump sta, pour conc	ls	1	10,785	10,034
conc pipe cons alternate	ls	1	10,785	10,334

Sewage Treatment Plant by N Y Board of Water Supply

The Margaretville-Arkville sewage treatment plant in Middletown, Delaware County, N Y will cost New York City's Board of Water Supply $1,079,287. The main contract to Thompson-Starrett represents 92 percent of this total, with 5.5 percent to a separate electrical contract and 2.5 percent to heating and ventilating. Equipment included in the main contract represents 21.9 percent of the total cost. Additional equipment is to be furnished by the city including substation and electrical control and chlorinating equipment.

The treatment plant includes a control building, digester building, two primary settling tanks, four sludge drying beds in glass enclosure, a sludge lagoon, filter dosing tank, six intermittent sand filter beds, water supply system, unsewered wastes tanks, outlet sewer and the necessary piping and equipment. Buildings will have brick walls with flat roofs of reinforced concrete slabs. Included in the contract are 1,720 ft of 15-in outfall sewer and 1,800 ft of access road with a paved width of 18 ft.

Electrical work includes furnishing, installing and testing the electrical systems and miscellaneous electrical equipment plus caring for, installing and testing substation and control equipment to be furnished by the city.

The heating system to be installed in the control building is thermostatically controlled, oil-fired, low pressure steam with one radiator and four propeller-fan type unit heaters. In the digester building heating is by a thermostatically controlled, 2-zone, recirculating hot water system with two radiators and one propeller-fan type unit heater supplied by hot water generated by the sludge digester installed under the treatment plant contract. Ventilating equipment includes nine stationary roof ventilators for the control building, digester building and water service pump chamber, four elbow type exhaust fans at the roofs of the control and digester building and a small exhaust fan in the water service pump chamber.

Irving V. A. Huie is president of the New York Board of Water Supply, Karl R. Kennison is chief engineer.

The bidders on this job were:

1C	Thompson-Starrett Co., Inc., Chicago, Ill., and New York, N. Y.	$993,299
2	Grove, Shepherd, Wilson & Kruge, Inc., New York, N. Y.	1,171,634
3	Shanahan Construction Co., Inc., Ellenville, N. Y.	1,648,550

Bids: 7-12-55

Items	Unit	Quantity	Unit Prices 1C	2
Remov soil	cy	6,500	$0.72	$0.45
Excavation, earth	cy	15,000	2.45	2.35
Refilling & embanking	cy	85,000	1.05	1.15
Excav, & refil pipe trnch				
up to 8' earth	cy	8,000	1.90	4.10
8'-12'	cy	2,000	6.65	5.25
over 12'	cy	2,000	6.65	7.00
Excavation, rock	cy	100	30.00	11.50
Surface dressng & grassng	cy	6,500	1.95	3.60
Pipes, VC or alt 6" & 8"	lf	1,500	1.65	2.30
10"	lf	500	2.55	3.50
12"	lf	750	3.55	4.15
15"	lf	2,900	5.10	6.75
18"	lf	700	5.75	8.00
24"	lf	230	7.45	12.50
30"	lf	675	10.40	16.75
VC pipes, underdrains,				
6" & 8"	lf	5,000	1.15	2.30
10"	lf	2,300	1.65	3.70
CI pipes & fittings	lb	130,000	0.29	0.25
Misc metal work	lb	65,000	0.45	0.65
Galvanizing	lb	31,000	0.06	0.10
Steel, reinf	lb	250,000	0.17	0.20
Articles of aluminum	lb	3,500	1.75	1.90
Rubber water stops	lb	1,150	1.65	3.20
Concrete & brick masonry	cy	2,000	75.00	80.00
Dry rubble paving	cy	450	24.50	29.00
Rubble paving in mortar	cy	20	30.00	58.00
Portland cement	bbl	3,500	6.00	5.30
Sand, cr stone & gravel	cy	3,000	8.30	13.00
Sand for filt & sldg beds	cy	16,000	8.00	10.00
Timber & lumber	Mbm	75	350.00	330.00
Bitum macadam pavement	cy	2,100	13.50	16.00
Wire fenc & beam-type guide rail	lb	33,000	0.30	0.28
Drill well, water supply	lf	50	120.00	7.00
Valves, sluice & tide gates	ls	job	10,500	23,000
Misc equipment	ls	job	7,000	7,500
Pumps, motors & appurt				
Sewage	ls	job	7,200	15,000
Recirculating	ls	job	1,230	2,000
Sludge	ls	job	3,500	4,000
Sump	ls	job	2,000	1,300
Water	ls	job	5,000	6,000
Misc water	ls	job	1,360	2,200
Comminutor, motor & aprt	ls	job	4,200	4,700

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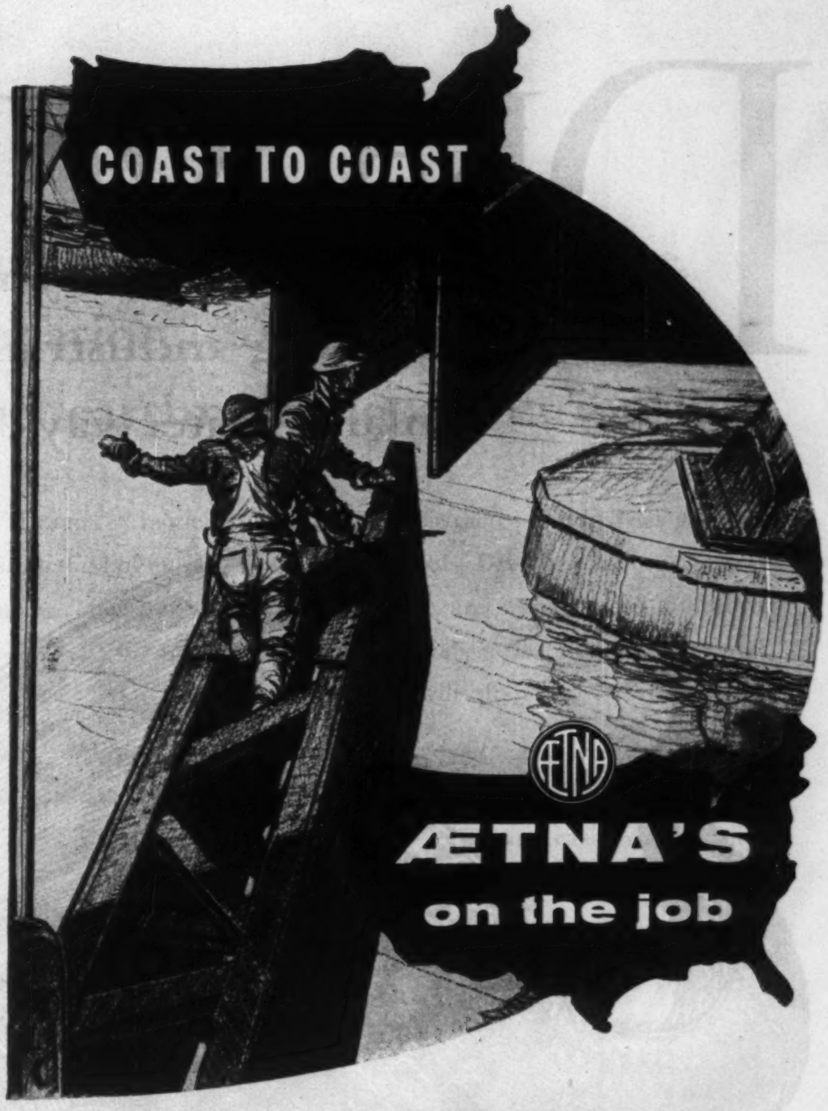

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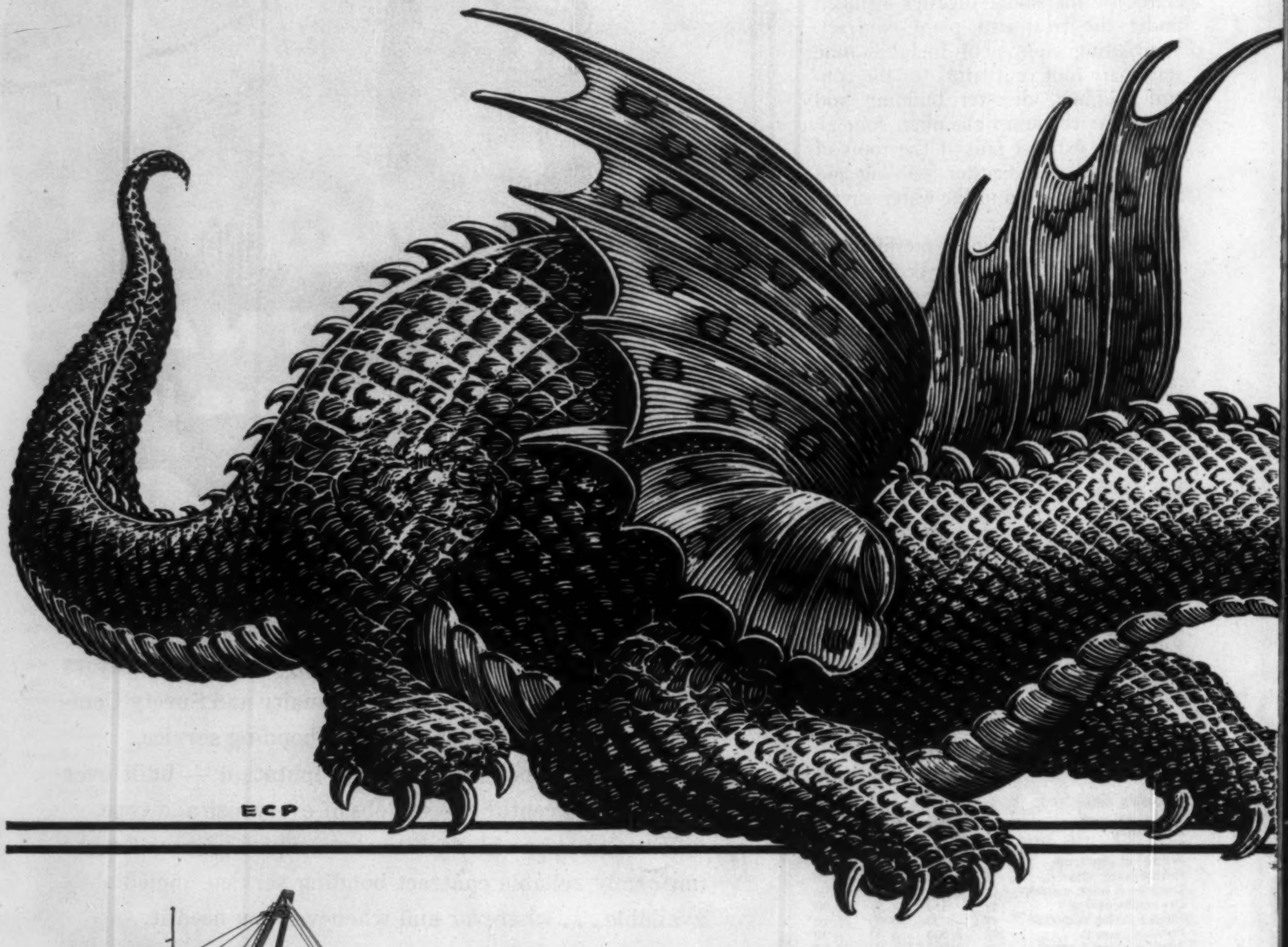
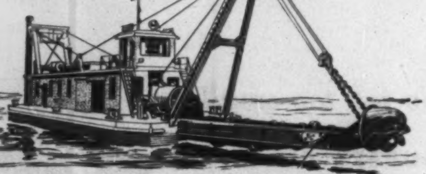
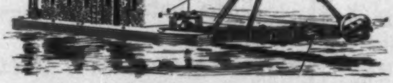
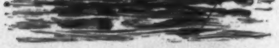




Ellicott "DRAGON" 20 — "GIANT" DRAGON, assembled in a few weeks; can pump 400-1250 cu. yds. per hr. through pipelines up to 6000 ft. Diesel-electric power.



Ellicott "DRAGON" 12—Dredges 100-400 cubic yards per hour of mud, silt, sand and clay and pumps through pipeline up to 4000 ft. long. Works in min. canal width of 50 ft.



Ellicott "DRAGON" 10—Easily assembled in 4 days, pumps mud, silt, sand and gravel through pipelines up to 2500 ft. long; capacity 75-300 cu. yds. per hr.

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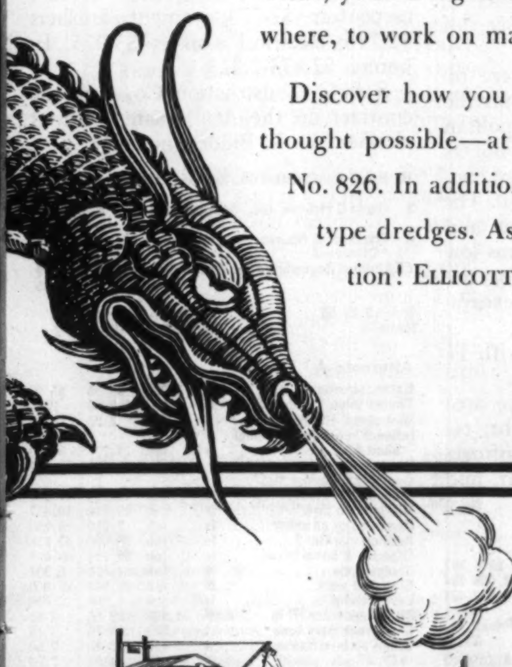

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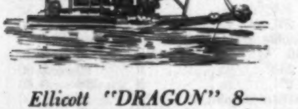
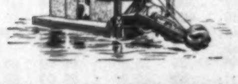
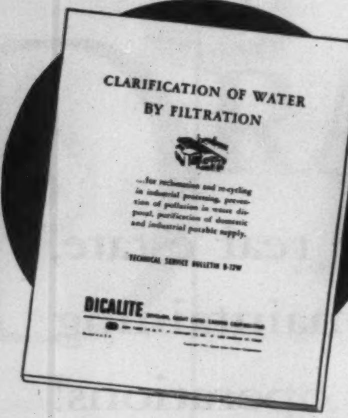


Ellicott "DRAGON" 8— **Capacity 50-150 cu. yds. per hr. through pipeline up to 2000 ft. long. *"Dragons"* available with enclosed or tropical deck house.**



***Ellicott "DRAGON" Model Canal Dredges*—6 to 12 in. sizes, built for irrigation and drainage canal maintenance, work in 13 ft. min. width, assembled in 1 day.**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Sewage Treatment, N Y

Continued from preceding page

Bids: 7-12-55 Items	Unit	Quantity	Unit Prices 1C	2
Sludge collect & scum skim equip, primary settling tanks	ls	job	6,460	13,000
Gasoline-eng generators & appurt	ls	job	13,900	18,000
Filter dosing equipment	ls	job	5,700	8,000
Care for, instal & test chlor equip f by city	ls	job	290.00	1,000
Flow metering equip	ls	job	3,800	4,600
Digestion tanks equip	ls	job	35,800	46,000
Sludge digest gas & heat equip & appurt	ls	job	7,240	9,000
Glass encl & appurt sludge beds	ls	job	17,000	19,000
Superstructures	ls	job	80,000	60,000
Painting	ls	job	14,000	17,000
Engineer's office & sanitary serv	ls	job	8,700	20,000
Cleaning up	ls	job	1,400	7,000

Completion time: 18 months • f furnish

Electrical Systems & Equipment

1C	Lord Electric Co., Inc, New York, N. Y	$58,888
2	L. I. Waldman & Co., Inc., Long island City	68,795

Heating & Ventilating

1C	John R. Philip, Inc., Scarsdale, N. Y.	$27,100
2	Sloan & Greenberg, Inc., New York, N. Y.	29,281

Completion time: 18 months, both contracts

Total project cost $1,079,287

Inverted Egg Sewer, Ky.

An inverted egg sewer of bricklined reinforced monolithic concrete in tunnel under the Louisville & Nashville Railroad Yard in the south central part of Louisville, Ky., includes 1,100 ft of 11-ft by 16-ft 6-in. sewer, and manholes and other connections as necessary at an average price of $764.76 per lin ft.

Five bids, widely spaced, were received on the project by the Louisville and Jefferson County Metropolitan Sewer District, Louisville, Ky. Thomas D. Nolan, of Louisville, took the contract on a low bid of $981,591.50. His bid was 11% below second low and 65% below the high bid. He was low by 21% on the lump sum for the sewer, and led in all items but excavation and backfill.

Work commenced July 11, with 11 months allowed for completion.

Wage rates prevailing in the area include: Bricklayer, $3.27 per hr; cement finisher, $3.00 per hr; reinforcement iron worker, $3.05 per hr; and common laborer, $2.00 per hr.

Bidders include:

1C	Thomas D. Nolan, Louisville, Ky	$981,592
2	Traylor Bros., Inc., Evansville, Ind	1,086,294
5	Dravo Corp., Pittsburgh, Pa	1,617,431

Bids: 6-30-55 Items	Unit	Quantity	Unit Prices 1C	2
Sewer, 11′ 0″ x 16′ 6″	ls	.....	$841,235	$1,020,900
Exc, limestone or shale tunnel	cy	3,100	30.00	2.00
open cut	cy	300	30.00	2.00
Cement grout	bbl	600	14.00	10.00
Drop inlets, 24″	ea	3	550.00	1,500
12″	ea	2	350.00	1,200
Above DI, 24″	vf	30	25.00	25.00
12″	vf	20	15.00	23.00
Cl D concrete refill	cy	500	23.00	25.00
Underdrain, 10″ pipe	lf	470	2.75	6.00
8″ pipe	lf	50	2.25	5.50
6″ pipe	lf	50	1.75	5.00
Underdrain in rock, 10″	lf	500	3.00	6.00
8″	lf	375	2.50	5.50
6″	lf	375	2.00	5.00
Tongue & groove bds, 1″	bdft	6,000	0.25	1.00
Sisalkraft paper	roll	15	15.00	50.00
Presolidification	lf	450	10.00	20.00
Stabilization of matls, 3″ depth	lf	150	1.50	5.00
4″ depth	lf	150	2.00	6.00
6″ depth	lf	150	2.50	10.00
Sandy backfill matls	t	1,000	2.25	1.00
Property serv connectn 12″ pipe	lf	100	6.00	10.00
6″ pipe	lf	100	4.00	8.00
Cement added	sack	1	1.50	1.00

Sewage Treatment at San Francisco's Airport

A $308,405 sewage treatment plant at San Francisco's International Airport will have an operation building 20′x50′x16′, an oil flotation tank 12′x10′, a clarifier 45′x8′, a digester 36′x37′, a 2-story digester pump house 20′x17′x22′ with necessary equipment and a pumping plant 25′x14′x15′. It will be a complete primary sewage treatment plant plus a combined sewage and drainage pumping plant. Utilities Engineering Bureau, Public Utilities Commission, San Francisco is the engineer.

The entire plant is to be built on composite piles in soft San Francisco Bay mud. Cl A concrete must test at 3,500 lb/sq in., Cl B at 3,000. Cast iron pipe is Cl 150 ASA Spec A21.6.

Prevailing wages include: pile drivermen $2.905, plumbers $3.05, concrete mixer trucks $2.0875-2.4425, carpenters $2.775, cement finishers $2.745; electrical workers $3.075, laborers $2.075-2.325.

S & Q Construction Co. took the contract on the A alternate, without clarifier No. 3. Bidders include:

1C	S & Q Construction Co., So. San Francisco	A	$308,405
		B	351,819
2	Oscar C Holmes, Inc., Redwood, Calif.	A	308,688
		B	348,001
3	Engstrum & Nourse, San Francisco, Calif.	A	328,536*
	* Corrected	B	369,736*
EE	Utilities Engineering Bu, San Francisco	A	210,910
		B	244,235

Bids: 5-23-55 Items	Unit	Quantity	Unit Prices 1C	2
Alternate A				
Excav, structure	cy	2,000	$8.35	$5.20
Timber piles, f & d	lf	8,600	2.60	2.45
Met cased, RC pile exten	lf	700	4.25	4.00
Influent sewer to sew pump plant 5	ls	job	4,771	3,700
Sewg & drain pump plant 4	ls	job	31,080	30,374
Oper bldg & minor plnt appurt	ls	job	44,946	41,169
Oil flotation tank	ls	job	10,840	10,457
Comminutor chamber	ls	job	7,910	6,950
Aerator, clarifier 2	ls	job	38,090	42,378
Digester & pump house	ls	job	59,724	69,939
Sludge beds	ls	job	4.875	5,307
Electrical work	ls	job	24,594	22,000
Landscaping	ls	job	1,800	2,000
Chain link fence, 7′ ip	lf	1,100	2.65	2.65
Crush rock pave base	t	500	3.10	3.10
Bitum surface course	t	150	7.20	7.50
WIP, 4″ galv, sch 40	lf	20	14.05	7.20
Pipe, double wrap, galv, sch 40, ½″	lf	225	3.65	1.90
1½″	lf	35	4.80	7.80
2″	lf	300	6.00	2.40
Pipe, double wrap, black sch 40, ¾″	lf	30	2.40	2.12
1½″	lf	60	3.00	2.50
2″	lf	375	3.60	2.85
CIP mechanical joint, 3″	lf	20	15.90	6 20
4″	lf	350	4.80	7.40
6″	lf	1,050	7.10	8.00
8″	lf	525	11.90	15.20
VCPES, 8″	lf	100	11 70	8.60
10″	lf	300	8.00	6.00
12″	lf	350	8.20	9.50

Bids: 5-23-55 Items	Unit	Quantity	Unit Prices 1C	 2
CMP 16 ga galv, 18"	lf	80	18.00	17.60
14 ga galv, 24"	lf	40	13.20	23.00
CMP 16 ga asb bonded with paved invert, 12"	ls	job	14.70	900.00
14 ga 18"	ls	job	3,400	3,200

Alternate B

Items	Unit	Quantity	Unit Prices 1 C	 2
Clarfieri 3	ls	job	$32,166	$28,653
Excav, struct, addl for clar 3	cy	700	5.35	5.20
Timber piles, f & d	lf	2,800	2.30	2.15
Met cased RC pile extension for clarifier 3	lf	250	4.25	4.00

• ip in place •f furnish •d drive •ES extra strength

Time allowed for completion, 270 calendar days Liquidated damages, $30/day.

Intercepting Sewer for Richmond, Va.

Part of a major sewage disposal project which will include treatment facilities for Richmond, this $809,521 Shockoe Creek intercepting sewer contract includes construction of 3,300 lin ft of 96-in reinforced concrete culvert pipe sewer complete with manholes, and intercepting chamber and overflow structures necessary to intercept the sanitary flow from an existing 27-ft x 15-ft arch sewer and a 17-ft x 12-ft box which now discharges raw sewage to the James River. The completed reinforced concrete structures will include three gates 48-in x 72-in, 48-in x 41-in and 48-in x 37-in in size and five 9-ft x 12-ft timber flap gates.

The depth of cut to the invert of the pipe will vary from 20 to 35 ft.

Design is by Greeley & Hansen, Chicago. Construction will be supervised by the Richmond Department of Public Works, Robert S. Hopson, Director.

The owner will furnish manhole frames and covers. The contractor furnishes all other materials. Class C concrete must develop 3,500 psi at 28 days, Class B, 3,500, Class D, 2,000.

Wage rates to be paid range from $1.65 for common labor through $2.50 for semi-skilled to $3.00 for skilled. Rail, highway and water transportation are all available at the site.

The eight bidders include:

1C	E G Bowles, Richmond, Va	$809,521
2	Dominion Contracting Co., Richmond, Va	883,075
8	Ahl Bros Constr Co., Inc, Branchville, Md	1,062,805
EE	Greeley & Hansen, Chicago, Ill	900,330

Bids: 7-5-55 Items	Unit	Quantity	Unit Prices 1C	 2
RC culv P sewer, 96", 20-35' deep sta				
0 to 24+75	lf	2,475	$135.78	$175.00
24+75 to 32+93.5	lf	818.5	206.86	300.00
Structs, intercept & overflow	ls	job	245,000	150,000
Manholes, 3'φ, standard	ea	2	1,000	1,550
drop	ea	1	1,200	1,850
Sheeting, lip, wood	Mbm	150	125.00	110.00
steel	lb	50,000	0.125	0.07
Excavation, rock	cy	100	20.00	10.00
Addl earth	cy	700	5.00	9.00
Selected fill material, gravel	cy	350	6.00	4.00
Crushed rock	cy	350	6.00	5.00
Concrete, addl, Cl B	cy	150	60.00	60.00
Cl C	cy	100	60.00	50.00
Cl D	cy	100	25.00	20.00
Steel, reinf, addl	lb	30,000	0.125	0.10

Time schedule: start 8-8-55, complete 450 calendar days
Liquidated damages: $100 per day

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Airports

Runway and Lighting for Portland Airport, Maine

A new 5,000-ft E-W runway and access taxiways for the Portland, Maine municipal airport will cost $883,081 for clearing, grading and paving, $44,158 for turfing and $37,184 for lighting. Seelye, Stevenson, Value & Knecht, New York are the consulting engineers.

The main contract to American Paving Co. of Meriden, Conn. is for a 150-ft x 5,000-ft runway and 60-ft x 5,875-ft of taxiway. The bituminous concrete pavement surface course is 2 ft 2 in, the base course of dry macadam is 8 & 9 in and the sub base course of selected material is 15 and 18 in.

The contract for hi-intensity R/W lighting and medium-intensity T/W lighting includes a new control vault in the administration building.

The turfing contract provides for 53 acres of intensive turf and 45 acres of non-intensive turf.

Wages range from $1.50 for common labor to $3.20 for skilled men.

Bidders include:

New East-West Runway

1C	American Paving Co., Meriden, Conn.	$883,081
2	W. H. Hinman Inc., Portland, Maine	1,134,548
5	H. E. Sargent, Stillwater, Maine	1,365,195
EE	Seeyle, Stevenson, Value & Knecht, N. Y.	1,125,767

Bids: 5-27-55		Quan-	Unit Prices	
Items	Unit	tity	1C	2
Clear & grub	ls	job	$26,300	$60,000
Clear	ls	job	2,000	8,000
bldgs & misc struct	ls	job	1,500	6,000
Remov exist pave	sy	7,500	0.20	1.00
Barricades, gate & transition road	ls	job	2,600	5,300
Remov exist drain struct	ls	job	250.00	1,700
Excavation, uncl	cy	651,700	0.41	0.58
Subbase course	cy	54,430	1.58	1.20
DB Macadam base	cy	28,575	5.35	6.00
Bitum surface, 2½"	ton	16,840	7.43	7.50
material for surf	gal	259,340	0.15	0.12
prime coat	gal	48,580	0.16	0.16
seal coat	gal	24,060	0.16	0.16
Cover aggr for seal	ton	721	3.15	5.00
Notch & scor or remov exist bit surf	sy	4,505	0.10	0.60
Overlay pave, drybound macadam base	cy	350	6.00	6.50
bit prime	gal	525	0.18	0.30
surf	ton	1,155	8.00	8.00
matl for surf	gal	17,770	0.16	0.12
tack coat	gal	820	0.16	0.25
seal coat	gal	1,640	0.16	0.25
Cover agg for seal	ton	49	3.50	6.00
RCP 12"	lf	2,511	nb	5.00
CMP 15"	lf	2,511	3.73	nb
RCP 15"	lf	800	nb	4.00
CMP 18"	lf	800	4.01	nb
RCP 18"	lf	2,400	nb	6.00
CMP 21"	lf	2,400	4.34	nb
RCP 24"	lf	4,023	nb	10.00
CMP 30"	lf	4,023	6.26	nb
RCP 30"	lf	1,532	nb	11.50
CMP 36"	lf	1,532	9.32	nb
RCP 42"	lf	80	15.50	22.00
RCP 30" incl pave replace	lf	858	9.00	20.00
6" subgr drs, perf VCP x str	lf	14,115	1.75	1.80
Porous backfill no. 2	cy	5,100	1.75	5.50
VCP 6"	lf	280	3.00	2.60
VCP 12"	lf	200	4.00	5.50
Swale inlet	ea	11	175.00	450.00
Swale inlet	ea	3	200.00	1,200
Inlet MH	ea	3	200.00	1,000
Catch basins	ea	22	175.00	350.00
Basin MH	ea	20	175.00	450.00
Subgrade drain MH	ea	10	175.00	400.00
Ordinary subgr dr MH	ea	16	175.00	375.00
Manhole	ea	1	200.00	2,500

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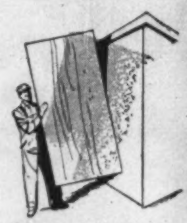

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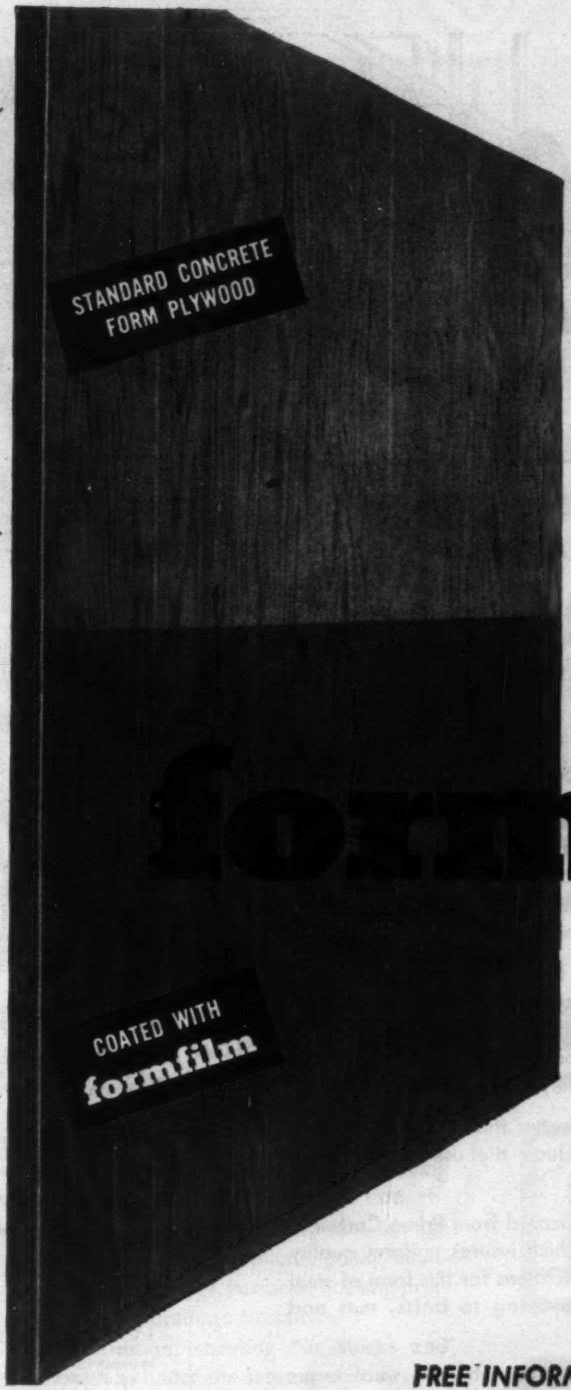

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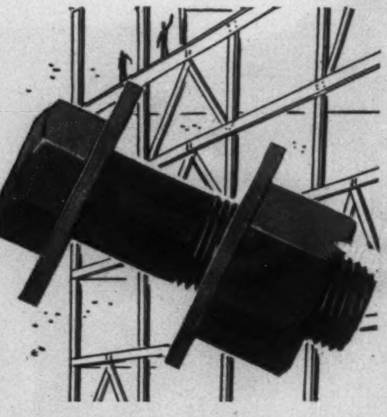
Because . . .

NO BOLT is ANY BETTER THAN ITS WASHERS



It pays to Specify **MIL-CARB*** CARBURIZED **WASHERS**

*TRADE MARK

for STRUCTURAL STEEL FRAMING

Today the swing in field assembly of structural steel joints is definitely toward *High Strength Bolting.* According to competent authorities who have had practical experience with this form of construction and evaluated its benefits, it is possible to *build better* and *build faster* by employing this method of joining steel members.

A primary essential, of course, is to use heat-treated, quenched and tempered bolts to produce a minimum ultimate strength of 120,000 psi for the usual size of bolt. At the same time, nuts must meet a proof load equivalent to the ultimate load of the bolts . . . *and the washers must be hardened, special quality steel.*

And because no bolt assembly is any better than its washers, consistent high-strength bolting should include the use of MIL-CARB Carburized Washers.

MIL-CARB Carburized Washers are fabricated from Prime Carburizing Quality Special Soundness Steel, which insures uniform quality control, always equal to the rigid specifications for this form of steel assembly (ASTM Designation A325, applying to bolts, nuts and washers).

Additionally, MIL-CARB Washers overcome inherent weaknesses often present in heat-treated washers fabricated from steel of questionable quality.

For uniformly sound construction specify
MIL-CARB Carburized Washers

Distributed by Leading Bolt Manufacturers and

U. S. STEEL SUPPLY DIVISION
United States Steel Corporation
208 South La Salle Street • Chicago 4, Illinois

WROUGHT WASHER
MANUFACTURING CO.
The World's Largest Producer of Washers
2224 S. BAY ST., MILWAUKEE 7, WIS

A 8000-⅔

Portland Airport, Maine

Continued from preceding page

Items	Unit	Quantity	Unit Prices 1C	2
Manhole	ea	2	200.00	550.00
Exten exist MH	ea	1	200.00	250.00
Raise exist MH fr & covs to new fin grade	ea	4	100.00	70.00
Conn to exist MH under txwy over pave	ea	1	300.00	125.00
Remove fr & cov & repl with new fr & inlet grat for MH	ea	1	75.00	125.00
Concrete HW no 1	ea	1	200.00	1,200
HW no 2	ea	1	200.00	1,200
HW no 3	ea	1	200.00	800.00
Rubble ditches	sy	400	6.00	4.00
Undergr airport ducts 2-3"	lfb	1,065	3.00	3.70
4-3"	lfb	330	5.15	5.50
6-3"	lfb	140	7.30	7.00
8-3"	lfb	75	9.40	8.50
under exist pave, 2-3"	lfb	170	8.00	7.00
6-3"	lfb	170	15.00	9.00
Undergr elect pwr ducts 4-4"	lfb	1,125	4.50	7.00
telephone ducts 2-4"	lfb	1,125	3.00	5.00
2-compart elect & teleph MH	ea	4	600.00	1,500
R/W & T/W pave painting	ls	job	2,000	2,000
Conc for cradles under drain lines, unit price only	cy	.....	20.00	25.00

*lfb lineal feet of bank *nb no bid

Turfing

1C	Transit Sodding Co., Hyde Park, Mass	$44,158
2	W. H. Hinman Inc., Portland, Maine	48,329
3	P. Rando & Co., Portland, Maine	68,205

Bids: 5-27-55

Items	Unit	Quantity	Unit Prices 1C	2
Prep ground surf type A	acre	64	$40.00	$100.00
type B	acre	39	40.00	80.00
Liming, type A	acre	64	12.00	45.00
type B	acre	39	12.00	45.00
Fertilizing, type A	acre	64	40.00	75.00
type B	acre	39	25.00	50.00
Sowing seed, type A	acre	69	115.00	100.00
type B	acre	39	97.50	80.00
Mowing, type A (3 mowings)	acre	192	20.00	12.00
Refertilizing, type A	acre	64	25.00	35.00
Reseed, type A	acre	10	115.00	100.00
type B	acre	10	97.50	80.00
Repairing	cy	300	3.50	6.00
Mulching	acre	103	135.00	80.00
Sodding	sy	510	1.98	2.00

Lighting: High Intensity Runway Medium Intensity Taxiway

1C	Kerr Electric Co., Auburn, Me	$37,184
2	Electric Service Co., Auburn, Me	44,658
5	Milliken Bros. Inc., Portland, Me	56,501

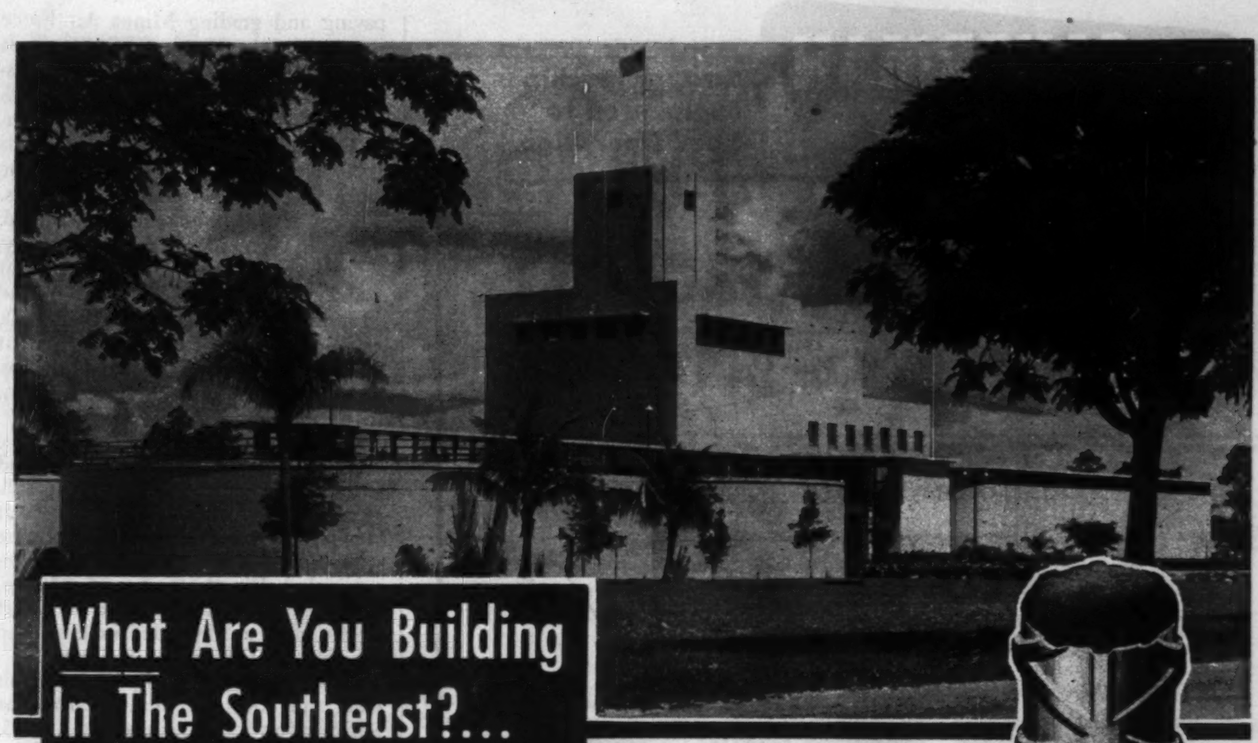
Bids: 5-27-55

Items	Unit	Quantity	Unit Prices 1C	2
New hi intens A/P elev marker, base mounted, f&i	ea	60	$145.58	$159.00
New A/P elev marker lts—column mtd, f&i	ea	147	62.30	72.00
All work in exist admin bldg, taxiway sys	ls	job	2,986	2,397
All other	ls	job	3,421	6,649
Underer cabl in duct, new f&i 1/C #8 3000V, new T/W circ	lf	5,500	0.13	0.21
exist circuits	lf	1,600	0.14	0.36
1/C #8 5000V, new R/W circ	lf	1,550	0.23	0.31
in trench f&i 1/C #8 3000V new T/W circ	lf	20,500	0.12	0.14
exist R/W circ	lf	1,000	0.19	0.36
exist obstf lt & other circ, incl reconnectns	lf	1,500	0.18	0.26
5000V, new R/W circ.	lf	14,000	0.22	0.24
Trench, BF & restor surf New T/W circuits	lf	13,800	0.21	0.24
New R/W circuits	lf	10,600	0.21	0.24
Rerout exist circuits	lf	1,500	0.21	0.24
Disconn exist bound lt circ & reconn exist isol transf for obstr lts to exist R/W circ	ls	job	150.00	80.00

*f&i furnish and install *BF backfill

Jet Airfield Paving and Fuel Storage, Minot, No. Dak.

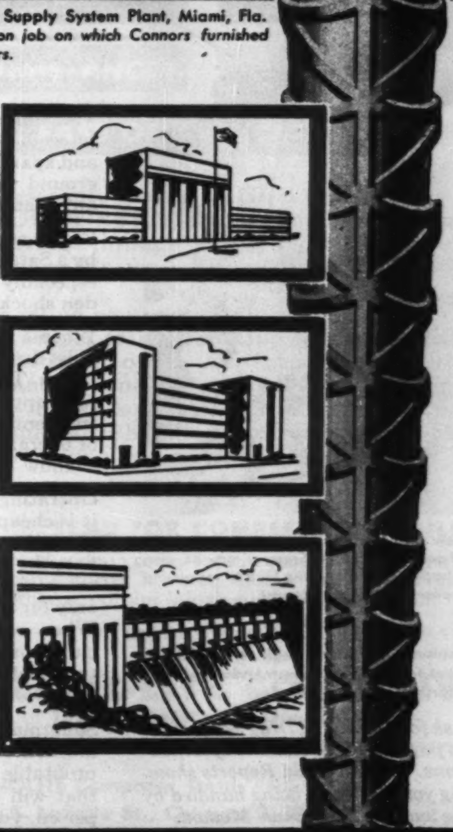
A base bid plus "additive" features "to be included in contract provided sufficient funds are available" broke the bidding into nine schedules which added up to the $3,643,339 contract awarded Peter Kiewit Sons' Co. for



What Are You Building In The Southeast?...

CONNORS WILL PUT THE STEEL ON THE JOB WHEN YOU NEED IT!

Southwest Water Supply System Plant, Miami, Fla.
Another construction job on which Connors furnished the reinforcing bars.



Whatever the nature of your Southeastern construction project, you want it to proceed as swiftly and smoothly as possible.

That means you want Connors to supply the reinforcing steel.

Connors is currently supplying reinforcing steel for a wide range of building projects throughout the Southeast, including hospitals, sewage disposal plants, water filter plants, public buildings, apartment buildings, barracks, housing projects, schools, and drainage structures.

Central location, standing bar stocks and fabrication shop under the same roof with mills enable Connors to provide exceptional service to all customers in the Southeast.

CONNORS PRODUCTS: Reinforcing Bars • Merchant Bars • Structural Shapes • Hot Rolled Strip • Studded T Fence Posts • Highway Sign Posts • Bulb Tees • Special Sections

HKP

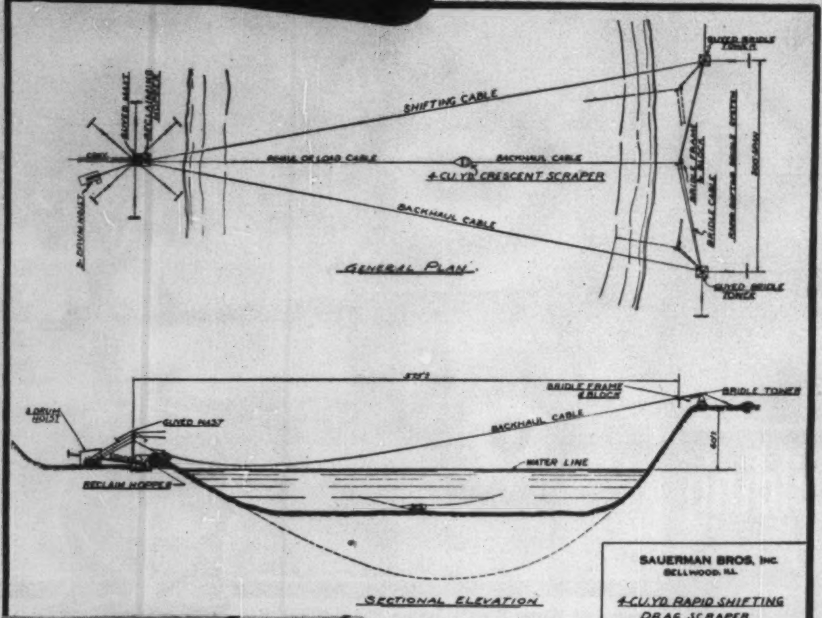
CONNORS STEEL DIVISION

H. K. PORTER COMPANY, INC.
OF PITTSBURGH

P. O. BOX 2562 BIRMINGHAM, ALA.

the SAUERMAN METHOD.....

Scraper Machines Engineered to Your Operation



Above drawing was prepared for a specific drag scraper installation and does not represent maximum spans.

View shows rapid shifting bridle frame and all operating cables. Crescent may be seen in background conveying load to reclaiming hopper just in front of mast.

•

Contact Sauerman's engineering department for specific recommendations and information. No obligation.

Ask for Catalog A, Drag Scrapers—24 pages of job photos and specifications. Request Field Reports showing your material being handled by the low cost Sauerman Method.

The Sauerman Method works equally well over widely differing areas and span limits . . . on hills, swampy ground or underwater . . . handles any material a dragline can dig.

Every scraper machine is powered by a Sauerman Roller Bearing Hoist, especially designed to withstand sudden shocks and changes in speed.

When a rapid shifter is used, a third hoist drum is added to shift the bridle frame. The rapid-shifting bridle system (upper right of drawing) permits frequent shifting of the scraper's line of operation in non-caving material, shallow excavations or overburden.

Operating costs are lower—basically, it is cheaper to drag material than it is to lift and transport it. You eliminate the power costs of moving heavy machinery about the area. You pay only for pay loads—not dead weight. When expendable parts—sheaves, clutch or brake linings—are replaced, the machine is restored to practically new condition.

Sauerman can help you select the method of materials handling most profitable for your job—a system that will give you the lowest cost per cu. yd. handled.

SAUERMAN BROS. INC.
632 S. 28th AVE. BELLWOOD, ILL.

Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks

paving and grading Minot Air Force Base, Minot, North Dakota. Bids June 21 were taken by Omaha District, Corps of Engineers. Henry C. Ranspot is assistant resident engineer.

The base bid included alternate bids on flexible and rigid pavement and the 2-way and 4-way alternates on culverts. The successful bidder bid only on the flexible pavement alternate. Runway, taxiway and aprons involve about 2,462,600 cu yd of excavation and 115,900 cu yd of concrete pavement, or 32,500 cu yd of concrete pavement and 211,700 sq yd of flexible pavement and 1,100 lin ft of culverts 15 in. to 48 in.

Jet fuel storage facilities involve dikes including impervious fill and surface treatment, two 5,000-gal bulk storage tanks and a 32 ft by 16 ft concrete block transfer pumphouse with piping and equipment. The dikes are included in the unit prices shown, but the other elements of this part of the work are included in the lump sum bid for the jet fuel facilities.

Minimum wage rates posted for this work include, per hour: carpenters $2.28, ironworkers, reinforcing $2.825, laborers $1.57, bulldozer operators $2.30, truck drivers $1.65 to $1.90.

Bidders include:

1C	Peter Kiewit Sons' Co., Sheridan, Wyo....	$3,643,339
2	Morrison-Knudsen Co., Inc., & McCormick-Erling Co., Seattle, Wash..............	3,813,582
6	S. J. Groves & Sons Co., Minneapolis, Minn.	4,706,099
EE	Omaha District Corps of Engineers........	4,074,348

Alternate base bid totals (including culverts)

	Flexible Pavement	Rigid Pavement
1C..................	$2,655,192	no bid
2..................	2,932,854	$3,729,105.89
3 Tecon Corp, Dallas.	2,967,265	4,032,878.55

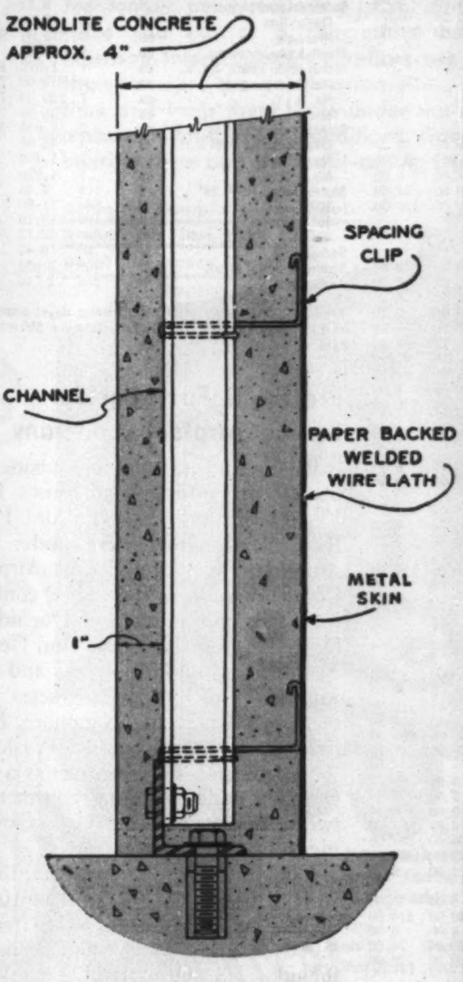
Time schedule: work to start 10 days after award, to be completed in 420 days. Completion date Aug. 23, 1956.

Bids: 6-21-55 Items	Unit	Quantity	Unit Prices 1C	2
Site, clear & grub.......	ls	job	$11,500	$17,500
Flexible pavement with				
Rigid pavement end sections on R/W				
Excavation..............	cy	1,860,000	$0.25	$0.31
Conc pavement, 16".....	cy	14,800	13.25	12.70
10".....	cy	2,380	13.25	12.70
Cement for conc pave...	bbl	25,800	6.50	6.20
Granlr filter crse 4".....	sy	263,000	0.25	0.36
Select matl subbase 38".	sy	209,000	2.10	2.54
48".	sy	11,300	2.70	3.22
52".	sy	34,800	3.00	3.48
58".	sy	8,840	3.30	3.85
Sub-base crse—35 CBR				
20".....	sy	201,000	1.50	1.80
28".....	sy	5,820	2.10	2.52
11".....	sy	11,300	0.80	1.00
Base crse 80CBR 6".....	sy	213,000	0.89	1.00
Stabiliz aggr base crse for blast paving.......	sy	14,700	0.60	0.79
Surface course..........	ton	17,600	7.70	5.40
Binder course...........	ton	26,100	7.70	5.40
Bit tack coat............	gal	40,600	0.16	0.17
prime coat..........	gal	66,700	0.16	0.16
material............	gal	596,000	0.14	0.15
Elect ducts, 4" x 4-way..	lf	4,740	8.00	8.10
4" x 12-way.	lf	95	18.00	18.00
4" RS conduit........	lf	130	3.00	3.10
Rigid pavement				
Excavation..............	cy	1,861,159	no bid	0.31
Conc pavement, 16".....	cy	54,900	nb	9.00
15".....	cy	42,400	nb	9.00
10".....	cy	5,340	nb	9.00
Cement for conc pave...	bbl	154,000	nb	6.20
Granlr filter crse 4".....	sy	263,000	nb	0.36
Select matl subbse 38"..	sy	5,820	nb	2.54
52"..	sy	130,000	nb	3.48
53"..	sy	106,400	nb	3.52
58"..	sy	20,100	nb	3.85

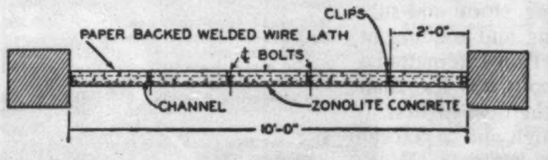
Continued on following page

Amazing New "THIN-WALL" System Earns 5-Hour Rating

SPEEDS CONSTRUCTION—CUTS COSTS


ZONOLITE CONCRETE
APPROX. 4"
SPACING CLIP
CHANNEL
PAPER BACKED WELDED WIRE LATH
METAL SKIN
1"

SPANDREL BACK-UP


CLIPS
2'-0"
PAPER BACKED WELDED WIRE LATH
℄ BOLTS
CHANNEL
ZONOLITE CONCRETE
10'-0"

PLAN

Machine Placed

ZONOLITE®

CONCRETE

Provides All These Advantages

INSULATION **FIRE SAFETY**

WIND RESISTANCE **ECONOMY**

EASE OF APPLICATION

Now for the first time, you can specify a spandrel or panel wall WITH A 5-HOUR FIRE RATING and at the same time achieve tremendous savings through weight reduction and rapid machine application. It's the new Zonolite vermiculite "THIN WALL."

The 5-hour rating was awarded in August, 1954, by Underwriters' Laboratories to a vermiculite concrete spandrel wall. This exceeds the rating of *any other* spandrel wall back-up. The vermiculite spandrel panel provides good insulating properties and has a 30 lb. per square foot wind pressure, more than adequate for multi-story building construction. Machine-placing cuts working time to a minimum.

SEND FOR COMPLETE DATA FILE

Send coupon today for kit, containing Underwriters' Laboratories fire test, design data, drawings, and other important information. No obligation.

ZONOLITE COMPANY

135 South LaSalle St. • Chicago 3, Illinois

ZONOLITE Company, Dept. ENR-95
135 S. LaSalle St., Chicago 3, Ill.

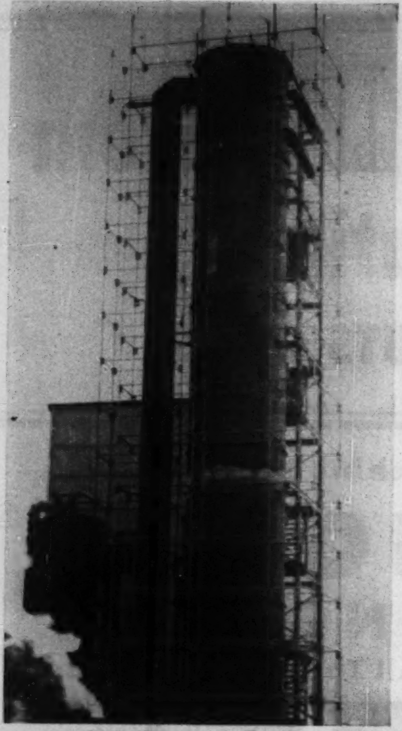
Please send me free kit detailing amazing new "THIN WALL" system which earned Underwriters' 5-Hr. rating.

NAME____________________________________

FIRM____________________________________

ADDRESS________________________________

CITY__________________ ZONE____ STATE__________

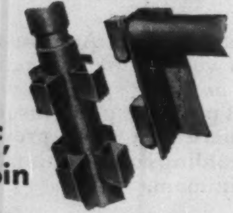


RIGID, SAFE SCAFFOLDING

that goes up fast with

NO X-BRACES
NO TOOLS
NO FASTENER PARTS

because of this simple, fool-proof, easy-to-join



SWISS-LOK

Patented

Erects easily over machinery, around piping, in congested areas, inside or outside any shape structure. As easily dismantled; stores compactly in narrow space. All standard parts will go through a 10" opening. Withstands extremely heavy loading.

Only eight different regular parts—no small parts for time-killing tinkering. This scaffolding can be erected as fast as the members can be slipped together. Holds planking any spacing, any direction. Economical to erect and dismantle for even those pesky short jobs in difficult places.

For real cost-saving from any angle—labor, time, safety, storage and maintenance—investigate SWISS-LOK utility or permanent scaffolding. Write for literature and prices, outlining your scaffolding needs.

SWISS FABRICATING, INC.,
2807 Camp Horne Road
Emsworth, Pittsburgh 2, Pa.
WEllington 1-2646

Jet Airfield, No. Dak.

Continued from preceding page

Bids: 6-21-55 Items	Unit	Quantity	Unit Pries 1C	2
Subbase crse 35 CBR	sy	5,820	nb	2.62
Stabiliz aggr base crse for blast paving	sy	14,700	nb	0.79
Bit prime coat	gal	3,910	nb	0.24
Surface course	ton	2,000	nb	10.80
Bit matl	gal	27,800	nb	0.19
Elect ducts, 4" x 4-way	lf	4,740	nb	8.10
4" x 12-way	lf	95	nb	18.00
4" RS conduit	lf	130	nb	3.10

Culverts

Items	Unit	Quantity	1C	2
42" ESRCP, 51" x 31" ESCRP arch, 48" bit ctd CMP, or 58" x 36" bit ctd CMP arch, optional	lf	1,135	22.00	21.60
End sections for same	ea	2	275.00	162.00
42" SSRCP or 48" bit ctd CMP, optional	lf	60	21.00	19.20
End sections for same	ea	1	275.00	162.00
Flap gate	ea	1	275.00	300.00
15" EXRCP or 15" bit ctd CMP, optional	lf	505	5.00	6.00
End sections for same	ea	2	50.00	60.00
Topsoiling	acre	510	140.00	210.00
Res engr office, incl all temp suppt facil	ls	1	15,000	11,000

Additive items (if funds available) Included in contract

Items	Unit	Quantity	1C	2
Excavation	cy	570,500	0.25	0.22
Numbering and marking	ls	job	9,000	10,000
Temporary seeding	acre	573	4.00	6.00
protection	acre	573	20.00	24.00
Permanent seeding	acre	573	100.00	120.00

Operational parking apron

Items	Unit	Quantity	1C	2
Excavation	cy	5,478	0.30	0.34
Conc pavement	cy	9,683	13.25	9.50
Cement for conc pavement	bbl	14,500	6.50	6.20
Granlr Fltr crse 4"	sy	23,257	0.30	0.36
Select matl subbse crs 52"	sy	23,257	3.25	3.50
Pip'g & elect duct, refuel	ls	job	15,000	6,000
Elect receptacle system	ls	job	5,500	5,000
Tie-down anchors	ea	25	10.00	4.80
Topsoiling	acre	12	140.00	210.00

Hangar access apron & taxiways

Items	Unit	Quantity	1C	2
Excavation	cy	25,530	0.30	0.34
Concrete pavement	cy	3,776	13.25	9.50
Cement for conc pavement	bbl	5,660	6.50	6.20
Granlr filtr crse 4"	sy	10,187	0.30	0.36
Selct matl subbse crs 54"	sy	10,187	3.50	3.60
Water pipeline under pavement, 10"	lf	190	10.00	6.00
Topsoiling	acre	9	140.00	210.00

Jet fuel storage facilities

Items	Unit	Quantity	1C	2
All except items below	ls	job	110,000	110,000
Imperv fill, grav surf & surf treat	ls	job	10,000	2,200
Excavation	cy	100	1.00	3.60
Spot subgrd reinforce	cy	100	5.00	6.00
Ch link fence blk strge	lf	766	5.00	4.90
gates	ea	2	150.00	205.00
Conc pavement, 11"	cy	4,710	19.25	14.20
Cement for conc pavement	bbl	7,070	6.50	6.20
Granular filter course	cy	5,270	3.50	3.60
Storm drains, 12" CP	lf	155	5.00	4.20
15" CP	lf	660	6.00	4.80
Manholes, Type C	ea	2	425.00	264.00
Inlets	ea	6	175.00	156.00
Perf pipe subdrains	lf	2,631	4.00	2.75
Water pipeline under pavement, 6"	lf	75	8.00	6.00
Topsoiling	acre	9	140.00	210.00
Seeding, temporary	acre	9	4.00	6.00
Protection, temporary	acre	9	20.00	24.00
Seeding, permanent	acre	9	100.00	120.00

*ES extra strength *SS standard strength

Aircraft Parking Apron and Drainage, Minnesota

At $384,134 the low bidder for the AFRTC apron paving, storm and subdrain system, grading and sodding at the Minneapolis-St. Paul International Airport in Minneapolis was less than one percent under the next highest, 6 percent under the high and 7 percent below the engineers' estimate. Work is for the District Engineer, St. Paul District, Corps of Engineers. Woodrich Construction Co. is the successful contractor.

Concrete, proportioned by weight, must test at 3,000 psi at 28 days.

Minimum wages certified for the job include: carpenters $2.80, laborers $2.05-2.755, ironworkers, reinforcing $2.87, truck drivers $2.05.

Bidders include:

1C	Woodrich Construction Co., Hopkins, Minn.	$384,134
2	Anderson & Sons, Minneapolis, Minn.	385,957
3	S. J. Groves & Sons Co., Minneapolis, Minn.	409,214
EE	St. Paul District Engineer; Corps of Engineers, St. Paul, Minn.	414,669

Bids: 6-28-55 Items	Unit	Quantity	Unit Price 1C	2
Excavation	cy	27,700	$0.62	$0.60
Rigid pave, base crse	t	15,300	2.03	2.00
Granular filter course	t	7,800	1.87	1.80
Concrete pavement	cy	12,320	11.45	12.40
Cement, conc pave	bbl	16,950	4.16	4.00
Tie down anchors	ea	281	7.20	5.50
Subdrain perf pipe	lf	1,530	3.32	3.50
Outlet line	lf	120	2.10	2.00
Manhole	ea	3	525.00	500.00
Flush & observ risers	ea	2	52.50	50.00
Storm drain inlets, No. 6	ea	1	1,070	900.00
No. 7	ea	1	810.00	750.00
No. 8	ea	1	920.00	786.00
No. 9	ea	1	735.00	700.00
Storm drain MH Nos. 2, 3	ea	2	1,645	506.00
Overdepth for MH 2, 3	vf	4	42.00	18.60
No. 4	ea	1	1,400	1,475
No. 5	ea	1	1,020	1,500
Storm drains RCP, 24"	lf	115	9.65	8.60
30"	lf	260	11.60	10.88
36"	lf	1,120	15.20	14.86
48"	lf	2,300	22.15	24.00
Sodding	sy	22,700	0.42	0.40
Storm dr outlet struct	ls	Job	7,952	1,800
Topsoiling	ls	Job	1.710	1,650

Time schedule: start, within 10 calendar days; completion in 135 calendar days. Liquidated damages $50/calendar day.

Pre-flight Facilities for Boeing Airplane Company

Paving and utilities for outside airplane work positions at Moses Lake Flight Center, Larson Air Force Base, Washington, went under construction July 11 for Boeing Airplane Company under a $1,218,000 contract with the joint venture of Donald M. Drake Co., Portland, Ore. and George A. Fuller Co., New York and Los Angeles. This tops the engineers' estimate by 15 percent. Naramore, Bain, Brady & Johanson, Seattle, Wash. are the engineers. This contract is a subcontract under a prime contract between Boeing and the U.S. Government.

Concrete paving includes 38,500 sq ft of 6½-in, 800,000 sq ft of 10½-in, 20,000 sq ft of 15-in, all to test at 4,000 psi. Asphaltic concrete paving includes 231,000 sq ft of 2-in. Work must be completed in 124 calendar days. Highway transportation is available. The job is 5 mi from railhead.

Work involves:

Item	Unit	Quantity	Unit Price
Strip topsoil, deposit spoil area	cy	180,000	$0.42
Machine excav, deposit & compact as fill within area	cy	25,000	0.38
Borrow, deposit & compact	cy	70,000	0.50
Conc pave, 3" base course, 2" top crse, dowels & jt sealing, 6½"	sf	38,500	0.44
10½"	sf	800,000	0.65
15"	sf	20,000	0.88
Asph conc pave, incl 3" base crse, and 2" top crse	sf	231,000	0.16
Oil on dust control area	sf	474,000	0.01
Paint striping, 6" wide	lf	no est	0.25

sq ft quantities are all surface measurements

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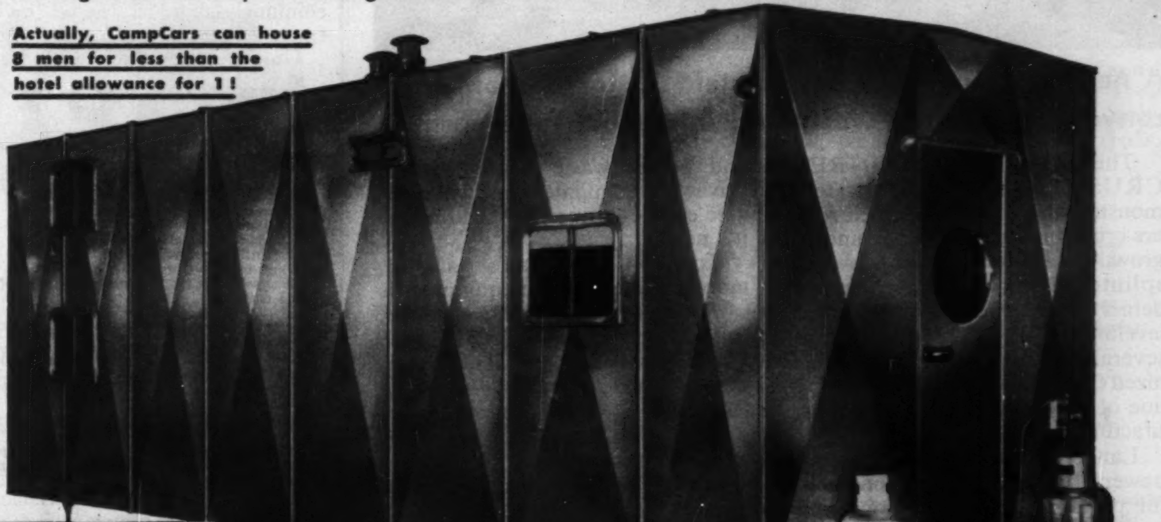
MORRISON International CampCars cut travel, housing, man-hour costs... KEEP YOU COMPETITIVE!

No longer need mounting travel and housing costs price you out of a competitive bidding position. Morrison International CampCars put your crews on-the-spot . . . the construction site . . . in minimum time and keep them there under the most favorable, morale-building living conditions. Gone are the costly housing rates and the profit-cutting travel allowances.

Actually, CampCars can house 8 men for less than the hotel allowance for 1!

CampCars are built to withstand rough off-highway travel as well as the thousands of tow-miles expected of them. They are fully insulated to withstand the most extreme outside temperatures, resist weather deterioration and are provided with safety features on all utility and sanitary equipment to assure safe, trouble-free use.



COMBINATIONS OF UNITS WILL ACCOMMODATE ANY SIZE CREW. Self-containment features make it possible for 2 to 50 or more men to live entirely independent of utilities and servicing for a week to 10 days.

SIX STANDARD MODELS TO CHOOSE FROM

- 8 Man . . . Dormitory with Complete Sanitary Facilities and Shower
- 8 Man . . . Combination Kitchen, Dining and Recreation Car
- 2 to 5 Man . . . Complete Living Facilities
- Complete Kitchen Car with Living for 2
- Dining and Recreation Car accommodates up to 22
- Office and Tool Car with Living for 2

Special Interior Layouts can be designed to suit your specifications

Designed and Manufactured by the Pioneer of Mobile Housing for Construction Crews

SHOWN UPPER LEFT: 8-man Dormitory CampCar showing 4 man-size bunks, with storage drawers and shoe lockers under bunks; also, enclosed dry chemical toilet.

SHOWN LEFT: 8-man Combination Cooking and Dining CampCar showing large dining and recreational area, plus 2 refrigerators, ample storage lockers and complete cooking facilities.

INTERNATIONAL EQUIPMENT DIVISION

MORRISON RAILWAY SUPPLY CORP.

1437 BAILEY AVE. BUFFALO 12, N. Y.
Telephone Fillmore 0444

Forest Remover

A new machine . . . a new system . . . for economically converting wooded wasteland into productive earth

This is the LeTourneau TREE CRUSHER . . . a 110-ton steel monster whose heavy, cleated rollers crush big trees and thick undergrowth alike. It leaves a wake of splintered wood and compacted debris — ready for burning. Forest leveling by Tree Crusher is one of several new approaches to mechanized land clearing available in a line of specialized equipment manufactured by LeTourneau.

Land clearing with tremendously powerful machines is only one field for profitable industrial pioneering now being opened with BIG LeTourneau equipment — equipment which represents a totally new concept in machine design. This concept combines *mass, power,* and precise *control* in machines for the BIG JOBS of land development.

Key to the amazing effectiveness of this new machinery is the LeTourneau system of electric power application and control. With it, engine-generator sets located anywhere on the machine supply power for electric gearmotors *located wherever work is to be done.* Even the wheels are individually powered by motors and gear reductions inside their rims. Design restrictions and power waste of mechanical drives are eliminated, and *all* available engine power is applied where it's needed.

Today LeTourneau's massive, mobile, diesel-electric equipment is working in Africa, South America, Canada, Alaska and throughout the United States in many fields of off-road, big-job operation, including land clearing, logging, heavy materials handling and cross-country transportation. And LeTourneau has still newer, more exciting power applications ready for TODAY'S PIONEERS.

Write us today about your off-road operation problems and let us help you solve them. Or send for literature on standard LeTourneau equipment.

SINCE 1929 — R. G. LeTourneau, Inc., has built BIG equipment for 26 years under the same corporate structure. In 1953 LeTourneau sold part of its business, retaining plants in Longview, Texas, and Vicksburg, Miss. Today LeTourneau creates and produces electrically powered and controlled equipment for logging, land clearing, and off-road transportation.

LeTOURNEAU

R. G. LeTOURNEAU, INC.
2729 S. MacArthur, Longview, Texas

LeTOURNEAU LeT EQUIPMENT *Equipment*

C-186

Runway Extension for Seattle-Tacoma Airport

Clearing, grading, drainage, lighting and concrete paving for a 1,000-ft runway extension at the Seattle-Tacoma International Airport will cost the Port of Seattle $257,869 under a contract with Northwest Construction Co., Seattle, Wash. G. T. Treadwell is chief engineer for the Port of Seattle.

Work is to be completed in 120 calendar days with liquidated damages set at $200 per day. It includes a new water line of 6" 10-ga steel pipe dipped and wrapped according to AWWA specifications in a vertical bath of hot asphalt or coal tar enamel and wrapped in 23¼# asbestos felt or equal.

Contractor cannot interfere with operation of existing runways during the course of the work.

Seattle wage rates include: carpenters $2.76, electrical workers $3.35, common labor $2.35, all including fringe benefits.

Unit contract prices include:

Bids: 6-15-55 Items	Unit	Quantity	Unit Prices
Clearing, structs, fences, trees, brush, fdns, septic tanks, walks, rocks, remov & cap utilities	ac	10*	$250.00
Excav, earth & surf gradg, cut	cy	189,100*	0.25
borrow	cy	143,300*	0.25
Grading, incl transp, compact, surf	ac	10	600.00
Conc pave, runway incl screeds & fine grading	sy	17,000	5.40
Cutting and re-pave, taxiway	ls	job	300.00
Instal drain lines, gutters, MH, CB	ls	job	17,044
Instal high-intensity lghts, & elec	ls	job	14,000
Soil conditiong, fert, roll, wtr, seed	ac	26.5*	900.00
Plant & misc	ls	job	6,000

* An alternate work area may be added to this contract at these prices.

Concrete specs require 5.5 sacks of cement/cy, 6 gal of water/94# sack of cement, and dry aggregate per sack: fine 213#-255#, coarse 368-380#, total 593#. Slump range 1½" to 2½"

Electrical work incl: install high intensity runway lights incl cables and connection to exist syst; temporary, then permanent relocation of threshold lights incl cables and connections· relocation of exist taxiway lights, installing of underground ducts and conduits

Rigid Taxiway on Oyster Shell Base, Houston, Tex.

The third taxiway connection to Houston's International Airport terminal area will cost $195,247, part of a 7-year, $8.2 million improvement program under the direction of J. M. Nagle, director, Department of Public Works, Houston, Tex. W. C. Lieb is design engineer.

Ramey Contracting Co. will build this 3,100-ft long, 75-ft wide pavement of 13-in reinforced concrete on 8 in of compacted sand stabilized oyster shell and compacted subgrade.

The unit price for concrete paving includes reinforcing, dowels, all joint materials except expansion joints. Expansion joints are 240 ft and 360 ft apart. Longitudinal steel is continuous between expansion joints, longi-

Continued on following page

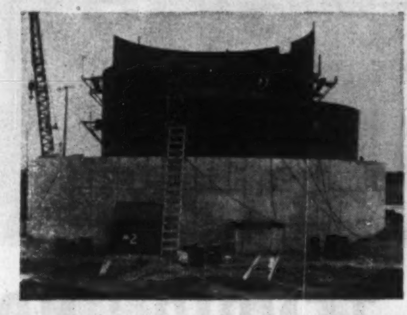
(*Advertisement*)

Prefabricated Form System Used For All Types of Construction

Saves Time . . . Labor . . . Material

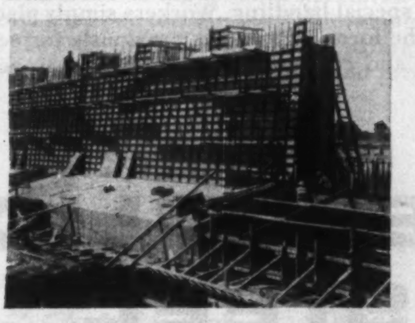
UNI-FORM Concrete forms are widely used in all types of concrete construction because they provide contractors with three important advantages: (1) Increased labor productivity — forming crews can erect more contact area per man hour; (2) Guaranteed material and labor savings and (3) Complete flexibility of application.

Simple mechanical assembly of plywood faced, steel-framed UNI-FORM Concrete Forms permits any labor force to become expert in a short time. All forming requirement — inside corners, outside corners, pilasters, one-side alignment and bracing, automatically accurate wall widths, scaffolding, etc. are engineered into, and provided with, the UNI-FORM System.



Circular wall formed with UNI-FORM Panels

Contractors using the UNI-FORM System have the basic equipment to handle any type of concrete construction. Complete engineering service . . . job analysis, forming recommendations, bills of material and forming details, together with field service are available to contractors through the manufacturer, Universal Form Clamp Co., Chicago, or through any of the company's many Distributor or Branch Offices.



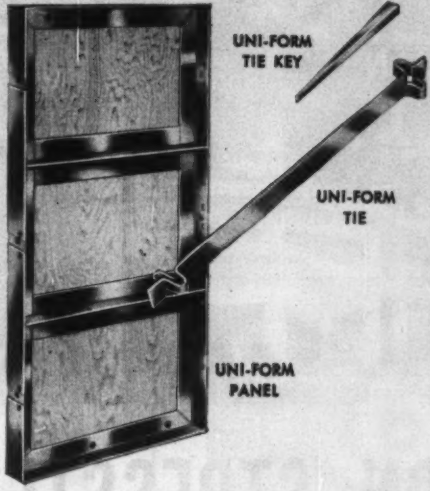
Battered wall forming with UNI-FORMS

A complete catalog, describing the UNI-FORM System of Wall Form Construction is available upon request. Write: Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago 51, Ill.

UNI-FORM Concrete Forms

SIMPLE . . . FAST . . . FLEXIBLE

3 BASIC ELEMENTS mean
Faster, Easier, More Accurate Forming



Simple mechanical assembly of UNI-FORM Concrete Forms provides faster forming . . . easier stripping and lowest all around costs. Ready to use when they reach the job, UNI-FORMS guarantee time, material and labor savings on any forming job. Let us prove UNI-FORM advantages . . . send us a set of prints for free recommendation and proposal on your next job. There's no obligation.

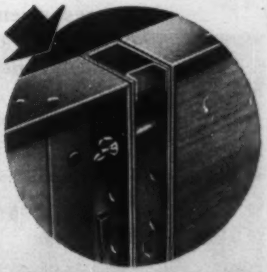
FORM CIRCULAR WALLS AT LOWEST COST

- No alignment or bracing on outside.
- Minimum excavation required.
- Free working area.
- Maximum job safety.

UNI-FORMING Circular walls costs less per square ft. of contact area . . . provides unhampered steel setting . . . greater control of concrete placement. Write for details on UNI-FORMING circular walls.

PREFABRICATED CIRCULAR WALL FILLER

Used on outside form only . . . assures true form curvature with standard UNI-FORM Panels.



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Mr UNI-FORM

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Downtown Center Parking Garage,
San Francisco, Cal.
Cahill Construction Co., contractors
George Applegarth, architect

SELF
PARKING
SELF
PARKING

TRUSCON STRESSTEEL TENSIONING NEW DOWNTOWN CENTER GARAGE

San Francisco's handsome new 9-story "self parking" garage is 'quake-resistant thanks to the added strength of its supporting members placed in compression by Truscon Stressteel Tensioning Bars—a product of Republic's Truscon Steel Division.

Prestressed concrete construction not only increases strength, but cuts deadweight, saves materials and allows longer spans. And, Truscon Stressteel Tensioning Bars now make prestressing practical . . . make prestressed concrete construction completely competitive with other types.

The patented Stressteel principle utilizes alloy steel reinforcing bars of extremely high strength, together with suitable anchoring assemblies. These alloy bars are fully capable of carrying the sustained high stress necessary to prestress concrete, and to place it in a permanent state of compression.

Truscon Stressteel Units require no special skills, no special handling. Workers simply place them in the form, or in holes previously formed in beams and columns. The bars are tensioned

REPUBLIC STEEL CORPORATION
3114 East 45th Street • Cleveland 27, Ohio

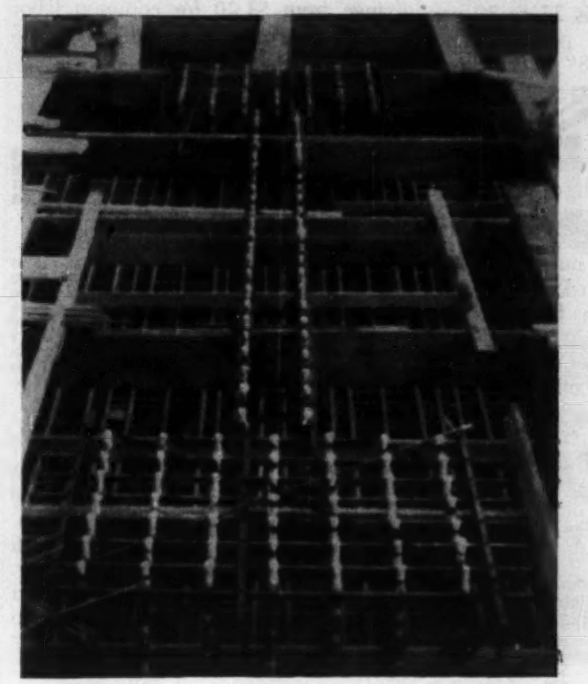
Please send me more information on:

☐ Truscon Stressteel Tensioning Bars
☐ Toncan Drainage Products
☐ Republic Plastic Pipe
☐ Republic Mine Roof Bolts

Name____________________ Title________________
Company______________________________________
Address_______________________________________
City____________________ Zone____ State__________
K-8550

REPUBLIC STEEL

Truscon Stressteel Tensioning Bars in place ready for concrete pour. Threaded ends protected by wrappings. After concrete has set, bars will be placed in tension by jacking and structure will be prestressed.



BARS HELP RESIST 'QUAKES

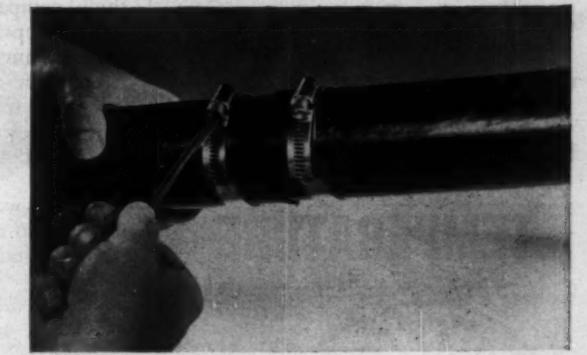
using hydraulic jacks. Depending upon length, Stressteel Tensioning Bars may be placed, stressed and anchored at the rate of 25 to 45 man-hours per ton of bars.

You can apply Stressteel advantages in bridges, building frames, dams, retaining walls, poles, piles, roof slabs, beams, bulkhead tiebacks, and to reinforce existing concrete structures. Write for more details on this interesting development, and for the Truscon Stressteel Manual listing applications, design data, specifications and procedures.

World's Widest Range of Standard Steels and Steel Products

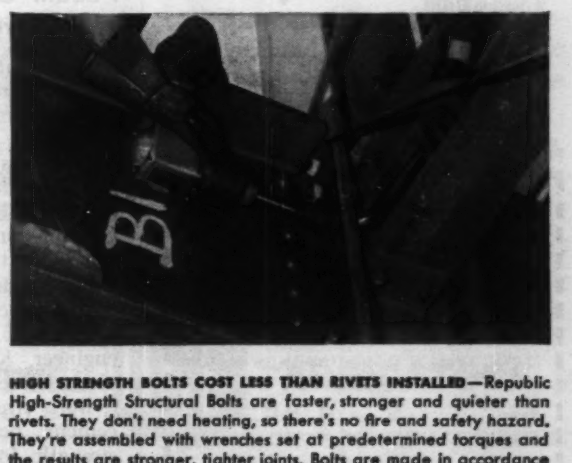
REPUBLIC STEEL

REMEMBER REPUBLIC FOR MORE CONSTRUCTION PRODUCTS:



NEED TEMPORARY WATER LINES? No better way than with Republic Plastic Pipe. Use it anywhere. Just lay it on the surface, even around corners, pick it up later for re-use. Necessary connections are easily and simply made. Keep Republic Plastic Pipe handy on every job. Choose from three kinds: Flexible Polyethylene, Semi-Rigid Butyrate and Kralastic—all lightweight, tough and corrosion-resistant. Pipe distributors have them in stock for you.

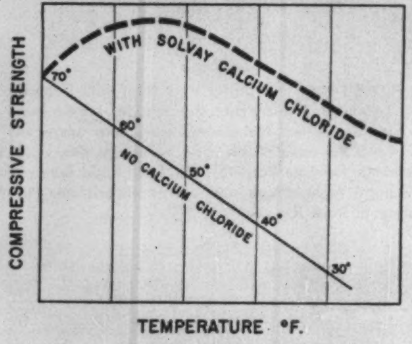
PERMANENT DRAINAGE CALLS FOR TONCAN DRAINAGE PRODUCTS— Water runoff is efficiently handled by Republic Corrugated Metal Pipe Arch (above). It's made of Republic Toncan Iron, which contains both copper and molybdenum—is more rust-resistant than any other ferrous material in its price class. Toncan Drainage Structures resist the strains of shifting soil... resist the crumbling, cracking, spalling common to non-metallic products. It's lightweight and easy to assemble, easy to place. Names of Toncan Drainage Products manufacturers on request.



HIGH STRENGTH BOLTS COST LESS THAN RIVETS INSTALLED— Republic High-Strength Structural Bolts are faster, stronger and quieter than rivets. They don't need heating, so there's no fire and safety hazard. They're assembled with wrenches set at predetermined torques and the results are stronger, tighter joints. Bolts are made in accordance with ASTM Spec. A 325. Marked for easy identification to conform to Spec. for Assembly of Structural Joints, 2-27-54, Research Council on Riveted and Bolted Construction.

SOLVAY

CALCIUM CHLORIDE KEEPS CONCRETE STRENGTH from DROPPING with the TEMPERATURE



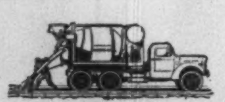
The Addition of SOLVAY CALCIUM CHLORIDE to Concrete During Cold Weather . . .

- Speeds finishing
- Cuts delays between operations
- Provides greater safety
- Permits faster removal of forms
- Assures full strength

NEW 25 LB. BAGS FOR READY-MIX CONCRETE

SOLVAY
CALCIUM CHLORIDE
ABSORBS MOISTURE
ENDS DUST
ENDS SLIPPERY ICE
ACCELERATES CONCRETE
SOLVAY

Easy-to-Handle
•
Assures Accurate Measurement
•
Saves Time



FOR FULL INFORMATION MAIL COUPON

Allied Chemical

SOLVAY PROCESS DIVISION
Allied Chemical & Dye Corp.
61 Broadway, New York 6, N. Y.

Gentlemen:
Please send me—WITHOUT COST OR OBLIGATION:

☐ "When the temperature drops BELOW 50°F., do you know what happens to CONCRETE?"

☐ "The Effects of Calcium Chloride on Portland Cement"

Name ....
Company ....
Address ....Position..............
City ....Zone....State...... EN-9

Rigid Taxiway, Texas

Continued from preceding page

tudinal construction joints are dowelled. Base material is 25 to 30 percent sand and 70-75 percent oyster shell, compacted to 8" in thickness with sheepsfoot rollers and finished with pneumatic rollers.

Concrete requires 5 sacks of cement per yard, 6.5 gal of water per sack, average beam strength of 650 lb/sq in at 7 days. Coarse aggregate is gravel.

Skilled wages top out at $3.125, semi-skilled range from $1.50 to $2.00 and common labor runs from $1.00 to $1.50.

The successful bidder was less than 2 percent under the engineers' estimate, over 2 percent under the second low, but almost 25 percent under the tenth and high bid. Bidders include:

1C	Ramey Contr. Co., Amarillo, Tex.	$195,247
2	Gulf Bitulithic Co., Houston, Tex.	201,046
10	Gaylord Const. Co., Houston, Tex.	260,672
EE	J. M. Nagle, Dir of PW, W. C. Lieb Des. Engr., Houston, Tex.	200,000

Bids: 6-1-55 Items	Unit	Quantity	Unit Price 1C	 2
Remove inlet & pipe	ls	job	150.00	150.00
Conc pave	sy	170	1.40	1.75
Conc pavement, 7"	sy	170	4.20	5.00
Undrgrnd duct, sgnl split 4"	lf	160	5.15	3.18
4-4"	lf	344	6.18	6.48
6-4"	lf	400	7.73	9.28
Cable trench	lf	2,100	0.42	0.54
Cable in tr, No. 8 1/c 5000 V	lf	2,600	0.52	0.39
Hi inten lights, rem & inst.	ea	2	283.25	40.00
Flush lights, remove	ea	3	283.25	13.00
CP Sew, all depths, C-76, 24"	lf	430	5.30	6.45
C-14, 24"	lf	1,500	4.65	5.65
Std airport inlet, with pad.	ea	2	215.00	200.00
without pad.	ea	1	203.60	150.00
doub with pad.	ea	1	400.00	300.00
Excav, uncl	cy	14,000	0.39	0.25
Subgrade preparation	sy	25,950	0.02	0.15
Shell base, 8" comptd snd stbl	sy	25,950	1.13	1.43
RC pavement, 13"	sy	24,650	5.58	5.40
Expan jt, Type A	lf	600	1.50	1.75
Type C	lf	1,410	0.60	0.65
Extra labor	manhr	100	1.00	0.01

Time schedule: start 7-6-55, allowed for completion, 90 working days.

Bridges

I-beam Girder Bridges for West Virginia

The Amherstdale bridge in Logan County attracted 11 bidders including a low of $64,810. Fishers Ford Bridge in Morgan County drew five bidders with a low of $285,812, both considerably under the engineers' estimates. Both are for the State Road Commission, George W. McAlpin, state construction engineer. J. N. Wallace, district engineer, Huntington, is in charge of the Amherstdale bridge and Kenneth Dunn, district engineer, Keyser, W. Va., is supervising Fishers Ford.

Both structures require six bags of cement per yard and a crushing strength for concrete of 3,000 psi minimum. All materials are furnished by the contractors.

Amherstdale will have two 58-ft 6-in. simple steel I-beam girder spans with a roadway width of 24 ft. The job is right on the railroad. Wages range from $1.20 for common labor through $1.55 for semi-skilled to $1.95 for skilled labor.

Bidders include:

Amherstdale Bridge, Logan County, W. Va.

1C	J. M. Francesa & Co., Logan, W. Va.	$64,810
2	Wallace Construction Co., Beckley, W. Va.	68,369
11	Agnew-Joseph Co., Ronceverte, W. Va	96,391
EE	State Road Commission, Construction Division	79,359

Bids: 8-9-55 Items	Unit	Quantity	Unit Prices 1C	 2
Excav, struct	cy	550	3.00	3.00
rock	cy	95	10.00	15.00
wet	cy	880	5.00	7.00
Concrete, superstr, Cl A	cy	74.6	60.00	50.00
Cl B	cy	875.1	35.00	33.50
Steel, reinforcing bars	lb	34,899	0.13	0.12
Dampproofing	sy	250	1.50	1.50
Steel, superstructure, 85t	ls	job	17,000	21,000
Sidewalk grating	sf	401	3.80	4.30

Time schedule: start 10 days after award
Complete 125 working days
No liquidated damages

Fishers Ford bridge will have two 73-ft 5 in. and three 92-ft continuous steel I-beam spans on concrete substructure and a roadway width of 26 ft. The job is on the B & O Railway. Wages range from $1.10 for common labor through $1.40 for semi-skilled to $1.85 for skilled.

Bidders include:

Fisher's Ford Bridge, Morgan County

Two 73'-5" and three 92' continuous I-beam spans on concrete substructure, also 1.308 mi of approaches, grading draining, asphalt concrete bottom and wearing courses

1C	R. B. Gay & Co., Roanoke, Va.	$285,812
2	Dodd Construction Co.	287,580
5	Monty Bros., St. Albans, W. Va.	331,543
EE	State Road Commission, Construction Division	345,427

Bids: 8-9-55 Items	Unit	Quantity	Unit Prices 1C	 2
Excav, struct	cy	317	$3.00	$3.00
rock	cy	65	15.00	10.00
wet	cy	258	6.00	8.00
Piles, steel bearing	lf	556	8.00	7.00
Concrete superstr, Cl A	cy	308	50.00	54.00
substr, Cl A	cy	120	40.00	50.00
Cl B	cy	571	37.00	44.00
railing	lf	855	7.00	7.00
Steel, reinforcing bars	lb	87,957	0.1175	0.12
Dampproofing	sy	122	1.50	1.50
Steel, superstructure, 250t	ls	job	69,000	74,000
Clear & grub	acre	23	200.00	50.00
Excav, uncl	cy	45,600	0.46	0.45
borrow	cy	40,000	0.46	0.45
Overhaul	Mstay	300	2.50	2.50
Excav, struct	cy	760	2.00	1.50
T B base, limestone	t	8,470	3.50	3.10
Prime coat, limestone	t	190	5.00	4.50
Bituminous material	gal	11,475	0.22	0.23
H L asph, c bottom, limestone	t	2,007	8.90	9.00
wearing, limestone	t	1,000	9.00	9.00
base crs, limestone	t	3,060	8.90	9.00
Sec plate pipe arch	lf	38	100.00	90.00
CMP, coated, 18"	lf	1,200	3.65	3.75
30"	lf	80	7.15	7.00
Concrete, Cl B	cy	32	38.00	50.00
Crushed stone, grav or sand	cy	42	10.00	5.00
Comb conc curb & gutter.	lf	60	3.00	5.00
Drop inlet casting	ea	2	30.00	40.00
complete, except casting	ea	2	250.00	150.00
Special rock fill	cy	3,980	1.50	1.00
Water for compaction	Mgal	60	5.00	8.00
Rip rap	cy	20	10.00	10.00

Time schedule: start within 10 days
Complete in 150 working days
No liquidated damages

Refurbishing the James River Bridge, Va.

Allowing four months for the job, the Virginia Department of Highways has let a $94,221 contract to Paint Products Co. for cleaning and painting the James River Bridge in Warwick and for cleaning and lubricating its lift span wire ropes.

The job includes the vertical lift span and towers, eight flanking truss spans, eight girder spans adjoining the main navigation channel, nine girder spans including the hump span over the secondary navigation channel, the exterior surfaces of the machinery houses, the truss span railings and ladders, in all 2,138 tons of steel in trusses and 800 tons in girders, a total of 2,938. Eight cables at each corner of the lift span account for 4,280 lin ft of 1⅜" cable to be cleaned and lubricated. Bids ranged from $600 to $3,500.

The four bidders estimated the job as follows:

Bidder: 6-15-55	Total Amount Painting	Cl & Pt Bridge $/ton	Clean & Lub Rope $/lin ft
Paint Products Co, Newport News, Va	$94,271	$31.54	$0.374
P N Spanos & Co Inc, Wheeling, W. Va	99,670	33.72	0.14
Universal Maint & Painting Co Pittsburgh, Pa	111,820	36.87	0.82
The Geo Tarbuk Co Inc, Midland, Pa	126,564	......	......

Plate Girder Underpass Duluth, Minnesota

The 75-ft through plate girder underpass of D M & I R Railway double track at Thompson Hill, Duluth, to cost $199,470, will be built by W. V. Roedter Construction Co. of Duluth for the State Highway Department, A. E. LaBonte, bridge engineer.

Work is to be completed March 15, 1956, but liquidated damages of $50 per day do not start until December 1, 1956 because this bridge is to serve iron ore hauling from the mines and special conditions in the contract require that there be no interruption of hauling during construction. Rail, highway and water transportation are all available to the site.

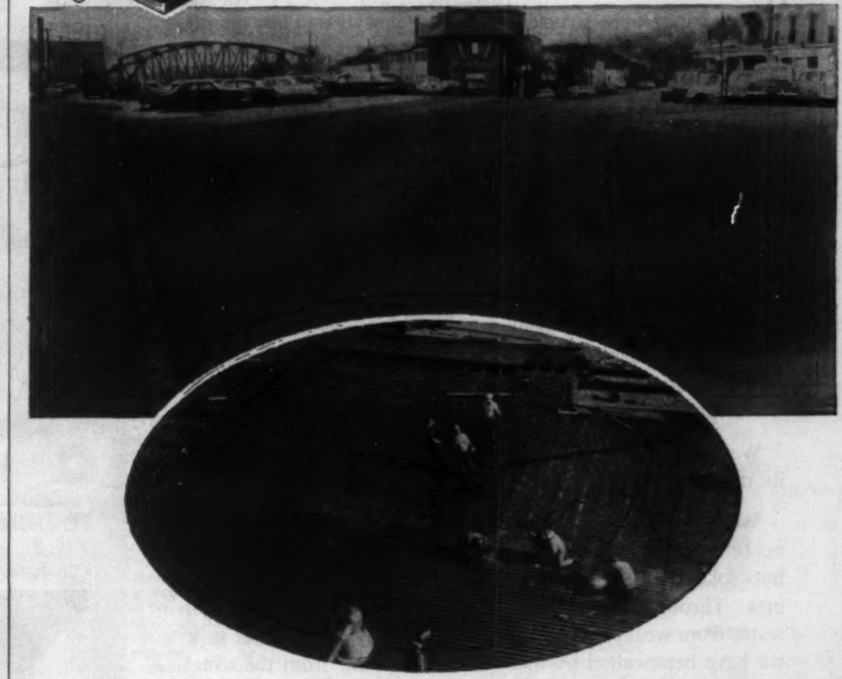
Wages to be paid range from $1.60-2.55 for common labor, from $1.95-2.65 for intermediate grades and from $2.30-3.15 for skilled trades.

The six bidders on this job and the bidding include:

1C	W. V Roedter Constr. Co., Duluth, Minn	$199,470
2	Brogan Construction Co., Des Moines, Iowa	248,683
6	Polaris Concrete Products Co., Duluth, Minn.	368,253

Bids: 8-5-55 Items	Unit	Quantity	Unit Price 1C	2
Excavation, Cl U	cy	2,500	$2.00	$7.00
Concrete, mix 1A6	cy	537	30.00	48.00
3Y6	cy	1,466	41.00	50.00
Steel castings, grade 70-36	lb	16,780	0.55	0.50
Sheet lead	lb	425	1.00	1.00
Standard name plates	ea	2	50.00	50.00
Structural steel	lb	311,940	0.20	0.24
Reinforcement bars	lb	130,030	0.15	0.13
3-ply joint waterproofing	lf	365	1.50	3.00
Wrought bronze	lb	685	1.50	2.00
Remove old struct, temp bents	ls	job	100.00	3,000
Cl C excavation	cy	8,500	2.00	1.65
Steel, struct phos-chrom	l	27,730	0.25	0.25
Selected back fill	cy	1,000	1.00	5.00

THE WORLD'S WIDEST BRIDGE
re-floored with
STRUCTURAL-PLATE
USF®
Bridge Flooring



For speed . . . for economy . . . the engineers selected USF Structural-Plate Bridge Flooring to restore the worn plank and block floor of the world's widest bridge at Lockport, N. Y. Actually a 400 ft. wide cover over the New York State Barge Canal, this 'bridge' posed a problem both from traffic rerouting and limited funds.

The solution was found in USF Structural-Plate Bridge Flooring which was rapidly welded in place and paved with asphaltic concrete. Material and labor were held to a minimum, and the least possible traffic delay was experienced.

Wherever worn plank floors are demanding constant repairs, replace them quickly and economically with USF Structural-Plate Bridge Flooring. Write for complete descriptive bulletin.

UNITED STEEL USF FABRICATORS, Inc.
WOOSTER OHIO

Steel Doors and Frames • Prefabricated Steel Buildings
• Steel Bridge Flooring • Highway Guard Rail
• Corrugated Metal Drainage Products

Here is how MANU-MINE is helping rebuild Flood Damaged Areas in Delaware and Lehigh Valleys

WHEN catastrophe struck in Eastern Pennsylvania last month, a fully integrated staff of over 200 engineers and experts at MANU-MINE Research & Development Company rolled up their sleeves and went to work.

We were called in by private industry, utilities and municipalities to repair and rebuild. Property damage in some areas was almost unbelievable, without counting interruption in business and loss of income for workers.

In the many rebuilding tasks we have undertaken, our objectives are twofold. 1. Completion of each must be rapid and permanent; secure against future recurrence. 2. Each job must have available the full resources of our organization to assure maximum future safety, stability and strength – at the lowest possible cost.

We at MANU-MINE know water. We know how to measure its destructiveness.

We build and repair reservoirs, employing entirely new engineering techniques. We change sub-surface water bearing sand into solid rock for stronger, permanent foundations and footings. Through sound geological engineering skills we keep water from weakening superhighways. Many of the other tasks we have been called on to accomplish are far from the usual.

The wealth of knowledge and experience we have gained in some of man's most difficult conquests of nature are yours to employ to repair the destruction that exists today or to build for greater progress tomorrow.

To give you a better understanding of MANU-MINE'S *varied services, we have prepared several interesting brochures. Copies are available upon request.*

MANU-MINE

RESEARCH AND DEVELOPMENT COMPANY
READING, PA. **PHONE: READING 6-4926**

Butler Industrial Buildings · Dry Wall Construction
Geological Engineering · Soil Solidification · Air-Placed Concrete

MANU-MINE Research & Development Co.
P. O. Box 167, Reading, Pa.

Kindly mail brochures checked below

- ☐ FAST INDUSTRIAL EXPANSION AT LOW COST
- ☐ THE ROLE OF GEOLOGY IN INDUSTRY
- ☐ THE SCIENCE OF SOIL SOLIDIFICATION
- ☐ REVOLUTIONARY NEW METHOD OF WALL CONSTRUCTION

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The fastest, strongest and most versatile industrial and commercial buildings.

FOUNDATION ENGINEERING—*Application of skilled Geological Engineering to assure strength, eliminate settlement.*

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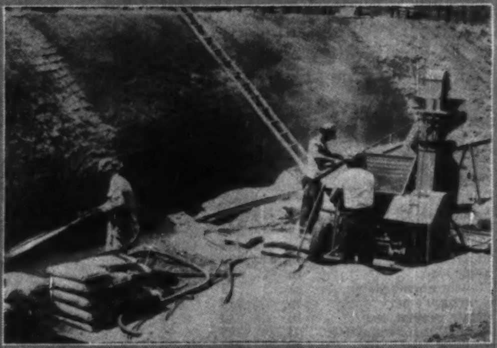
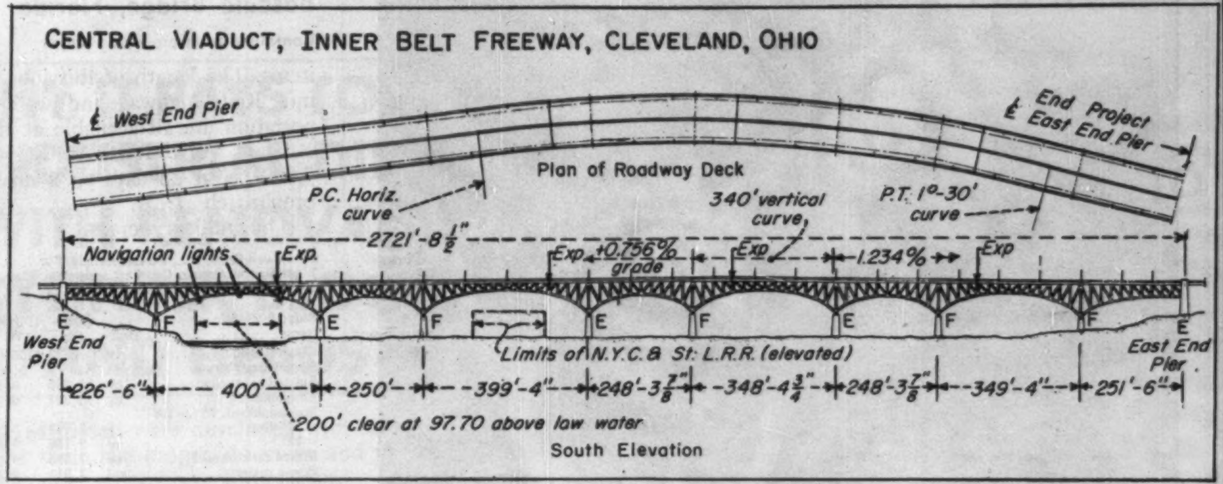


DRY WALL CONSTRUCTION — *The strongest, most versatile method of masonry construction for many uses.*


CENTRAL VIADUCT, INNER BELT FREEWAY, CLEVELAND, OHIO

Central Viaduct, Largest Structure on Cleveland Inner Belt Freeway

Crossing four railroads, the Cuyahoga River and various Cleveland streets the Central Viaduct will link the freeway system with downtown Cleveland. Ohio Department of Highways, S. O. Linzell, director, awarded this $8.1 million contract to John F. Beasley Construction Co., Chicago, the low of four bidders.

Work includes two lines of deck cantilever trusses with curved bottom chords, spaced 90'-4" c to c. Transverse floor beam trusses at 25' support continuous steel stringers and a reinforced concrete deck. Nine spans total just under 2722 ft and the deck carries two roadways of 52 ft, a median of 4 ft and 3-ft sidewalks. It must be completed by November 30, 1957.

A curved, ascending alignment complicated the steelwork. This includes two tangents meeting in a 1°30' horizontal curve for about 1,400 ft of the middle portion of the bridge. The profile includes an ascending grade, a short vertical curve nearly centered on the PI of the horizontal curve, and a descending grade.

The substructure, let under an earlier contract, is under construction. It consists of individual hollow concrete piers supported on cast-in-place concrete piles.

All materials are furnished by the contractor. Class C concrete requires 6.5 sacks of cement per cu yd.

The contractor must carry up to $300,000 in public liability insurance and up to $600,000 in property damage insurance including coverage for damage to railroad property.

Minimum wage rates to be paid include: for air compressor operators on steel erection $3.40, crane operators $3.40, carpenters $3.325, structural painters $3.20, intermediate skills $2.575-3.125, unskilled workers $1.90 per hour.

Bidders include:

1C	John F. Beasley Constr Co., Chicago, Ill.	$8,132,000
2	American Bridge Div., U. S. Steel Corp., Cincinnati, Ohio	8,168,683
4	Mount Vernon Bridge Co., Mt. Vernon, Ohio	8,483,831
EE	Ohio Department of Highways	7,781,630

Bids: 7-12-55 Items	Unit	Quantity	Unit Prices 1C	2
Concrete Cl C	cy	7,280	$65.00	$83.00
Steel, reinf.	lb	2,324,480	0.11	0.15
struct, carbon	lb	15,000,000	0.261	0.256
struct, manganese	lb	9,660,000	0.27	0.266
Fld painting, struct steel & drain sys	lb	25,733,000	0.3065	0.007
Cop water stops, incl 1" hot poured jt sealer	lf	2,592	4.00	3.15
Rubber expan jt filler 1" prefm gray	sf	73	4.00	4.05
Handrail, aluminum	lf	5,404	14.00	17.00
Walkway grating	sf	8,225	3.50	3.65
Rdwy lightg sys, prt A	ls	lump	25,000	66,150
Rdwy lightg sys, prt B	ls	lump	15,000	24,600
Navigation lights	ls	lump	2,000	8,200
Electrical grounds	ls	lump	2,000	5,400
Cop tubes, subdrain wearg surf crse	ea	738	6.00	7.65
Rdwy drainage sys	lb	1,073,000	0.43	0.325
Premium on industrial ins	ls	lump	60,000	12,000
Maintng traf, incl lights, sgns, barricades & watchmen, 24-hr serv	ls	lump	27,713	25,000

Substructure

1C	Horvitz Co., Cleveland	$1,466,198
2	National Engring & Contr Co. Cleveland	1,545,331
9	L. B. Strandberg & Son Co., Inc, Chicago	2,210,132
EE	State of Ohio, Department of Highways	2,156,200

Bids: 10-14-54 Items	Unit	Quantity	Unit Prices 1C	2
Cofferdams, cribs, sheetg	ea	20	$2,800	$5,000
Excav, unclas	cy	17,227	2.70	3.20
Conc, Cl E, footings	cy	6,098	26.30	21.00
above footgs.	cy	5,171	35.00	38.00
Steel, reinf	lb	1,393,558	0.11	0.105
struct	lb	29,148	0.40	0.36
WI ladder rungs	lb	7,021	0.45	0.50
Fld paint, struct stl, 2 cts	ls	job	300.00	1,100
Xpan jt matl, ½" spng rub	sf	716	2.00	1.50
Pile test load, first	ls	job	900.00	1,750
subsequent	ea	5	800.00	1,200
Piles, steel bearing	lf	4,680	5.50	5.30
RC cip 14"	lf	113,045	4.35	4.65
Remov exist struct, No. 1	ls	job	65,000	45,000
2	ls	job	40,000	34,300
3	ls	job	1,000	10,000
4	ls	job	1,000	8,250
conc pedestals	ls	job	5,000	1,400
Electrical grounds	ls	job	1,100	460
WIP incl specls, 8"	lf	1,038	17.00	20.00
Pipe for storm sewers, 8"	lf	6	5.00	2.50
12"	lf	1,333	4.40	5.50
under pave, 12"	lf	251	7.20	15.00
15"	lf	335	5.00	6.22
ESRC culv, 15"	lf	288	11.20	13.00
under pave, 18"	lf	80	10.00	7.00
21"	lf	142	7.50	8.50
24"	lf	932	9.00	10.00
ESRC culv, 24"	lf	290	11.00	14.00
under pave, 24"	lf	116	18.00	21.60
pav bit ctd CMP, 24"	lf	60	8.50	11.60
pav bit ctd CMP, 27"	lf	80	10.40	14.00
ESRC culv, 36"	lf	30	20.00	28.00
Pipe specials, 12", 35° wye	ea	1	20.00	18.00
8" to 12" increaser	ea	16	20.00	15.00
8" to 15" increaser	ea	2	27.00	21.00
Mlanholes, std No. 1	ea	16	320	340
Ater manhol A	ls	job	2,100	4,100
B	ls	job	1,200	2,700
C	ls	job	125	380
D	ls	job	820	1,400
F	ls	job	1,400	2,700
Outlet structure A	ls	job	240	570
B	ls	job	240	570
C	ls	job	200	630
Remove manhole E	ls	job	40	30

Support for Erie Railroad Tracks

Items	Unit	Quantity	Unit Prices 1C	2
Excav, roadway	cy	5,940	$1.50	$2.20
Borrow	cy	3,000	0.50	2.00
Conc, Cl E, anchor caps.	cy	73	57.00	65.00
Steel, reinf in anchor caps	lb	7,900	0.13	0.18
Steel sheet piling *	lb	877,000	0.13	0.12
Steel anchor rods, trnbkls, pipe slvs & fastn, dockwalls †	lb	43,000	0.26	0.32
Fenders for dockwalls, creos timbr, inc hdware	Mbf	2.4	325.00	700.00
Crib wall, temp. timber	sf	1,965	4.00	5.50
Maint & safegrd traffic, incl lights, signs, watchman	ls	job	1,000	5,000
Premium on industl insurance	ls	job	7,000	7,120

* incl reinf plate, steel H anchor piles & steel wales, and timber connection angles, for dockwall

† incl necessary excav, sheeting and bracing

	1C	2
Total for bridge substructure	$1,308,770	$1,376,489
Total for support for Erie tracks	149,428	156,723
Maint traffic and insurance	8,000	12,120

Bascule Bridge at Ft. Lauderdale, Florida

Contract for the 235 ft bridge with a single-leaf, electrically operated bascule span at Fort Lauderdale, Fla. went to Powell Bros., Inc., of Ft. Lauderdale at $505,638, the low of two bids. Work is for the State Road Department under the direction of H. E. Lewis, state highway engineer.

The bascule span piers are founded on concrete piling. I-beam approach spans are on concrete bents. Incidental bridge and approach work in this contract include maintenance of traffic, constructing and removing a detour, embankment, road base and surface course and incidental roadway

Continued on following page

(*Advertisement*)

THE IMMENSITY of the Los Angeles County Sewer system project is accentuated by comparison of workmen with 144 inch diameter concrete pipe.

Vibration Important Feature in Production of 144 Inch Concrete Pipe

- **Los Angeles installation**—The expansion of facilities of the County Sanitation Districts of Los Angeles necessitated installation of 7800 feet of 12 foot diameter reinforced concrete pipe. The pipe is 12 feet in length with tongue and groove joints and with a shell thickness of 12 inches. The pipe sections weigh about 39 tons per length.

- **Manufactured at plant**—Reinforcing consisted of a double cage, one of which was elliptical in shape. Cages were manufactured at the plant site and the circumferential reinforcement welded to the longitudinal bars. The cages were dropped over the inner form and held in place by appropriate spars. The outer form was then placed, and the job was poured in the usual manner.

- **Tests made**—United Concrete Pipe Corporation used three Model PX Vibrators on steel forms specially constructed to eliminate leakage of grout or water. Tests made of concrete in these pipes show high strengths, as much as 7000 pounds per square inch not being uncommon.

- **An interesting manual**—on "How to Apply, Operate and Maintain EXTERNAL VIBRATORS in the MANUFACTURE of CONCRETE PIPE" can be obtained by writing Viber Company, Burbank, California.

- **For further information**—on Viber's complete line of internal and external vibrators, contact your authorized distributor, or Viber Company, Dept. 76, 726 South Flower Street, Burbank, California.

CONTROLLED HIGH SPEED external vibration with Viber Model PX vibrator produces smoother finished surface inside and out. High strengths obtained in this pipe would have been impossible without vibration.

VIBER CO

CONCRETE VIBRATORS SINCE 1931

Bascule Bridge, Florida

Continued from preceding page

items. The length of this job is 0.288 mi. Rail, highway and water transportation are all available at the site.

Class A concrete must develop 5,000 psi at 28 days on a mix of approximately 1:2:4.

The bidders were:

1C	Powell Bros., Inc., Ft. Lauderdale, Fla	$505,638
2	Industrial Constr. Co., Ft. Lauderdale, Fla	535,903
EE	State Road Department of Florida	500,000

Bids: 6-23-55			Unit Price	
Items	Unit	Quantity	1C	2
Clear & grub	acre	5.22	$150.00	$200.00
Remov exist struct	ls	1	5,000	8,500
Subsoil excavation	cy	35,695	0.40	0.31
Embankment	cy	73,527	0.60	0.81
Stablzd rdbed, 75 lbs BV				
6" deep	sy	2,792	0.20	0.18
12"	sy	9,156	0.30	0.28
Miami rock base, 8"	sy	7,556	0.98	0.98
Prime material	gal	1,511	0.20	0.22
Tack coat material	gal	604	0.20	0.20
Bit surf trtmt, type 1-A				
semisol asph	sy	7,556	0.25	0.21
cutback asph	sy	7,556	No Bid	No Bid
emulsified asph	sy	7,556	No Bid	No Bid
Asph cement plant mix	gal	7,334	0.13	0.14
Asph conc surf crse, type II, vari thickness	t	416	6.50	7.15
Cmt conc pave, reinf 9"	sy	239	10.00	10.00
Treat struct timb, 12-lb.	Mbm	11.7	400.00	400.00
Conc, Cl A, appr spans	cy	404.6	50.00	65.00
bascule pier	cy	842	45.00	40.00
counterweight	cy	192	45.00	41.00
endwalls	cy	5.06	85.00	100.00
Concrete, seal	cy	349	45.00	65.00
Concrete, handrail	lf	356	9.00	12.50
Steel reinf	lb	155,960	0.11	0.11
Steel structl,				
bascule leaf, 234,000 lb	ls	1	65,000	68,550
approach spans	lb	196,830	0.14	0.16
Machinery & castings	ls	1	35,000	41,600
Conc pipe culv, 15" storm sewer	lf	236	5.00	3.00
Bit ctd MP culv, 15" storm sewer	lf	103	5.00	3.00
Treated timber piling	lf	4,690	2.75	2.90
Precast conc piling, 18" sq	lf	6,200	8.00	7.80
Unloaded test piling, 18" sq	lf	180	25,00	25.00
Test load	ea	1	500.00	750.00
Inlets	ea	8	325.00	300.00
Conc curb & gutter	lf	80	2.00	3.30
Conc sidewlk, 4"	sy	36	4.00	4.00
ROW mrkrs, instl only	ea	4	5.00	2.00
Metal guardrail	lf	1,550	3.00	2.90
Grassing & mulching	sy	17,600	0.10	0.045
Mulch material	ton	11	60.00	50.00
Steel rdwy floor, 5"	sf	2,674	5.00	5.30
3" armored	sf	777	4.00	4.60
Steel sidewalk floor	sf	480	4.00	4.20
Control house	ls	1	6,000	5,000
Electrical equipment	ls	1	34,000	28,000
Shear connectors	lb	4,278	0.50	0.50
Spec conc gutter	lf	2,358	2.25	1.95
Conc traf separator type I	lf	1,249	4.00	3.87
Construction of detour	ls	1	30,000	29,000
Maintenance of detour	mo	12	200.00	175.00
Replac fender piles, detour bridge	ea	15	25.00	50.00
Fender timbers, detour bridge	Mbm	2	300.00	150.00
Remov detour	ls	1	3,500	4,500

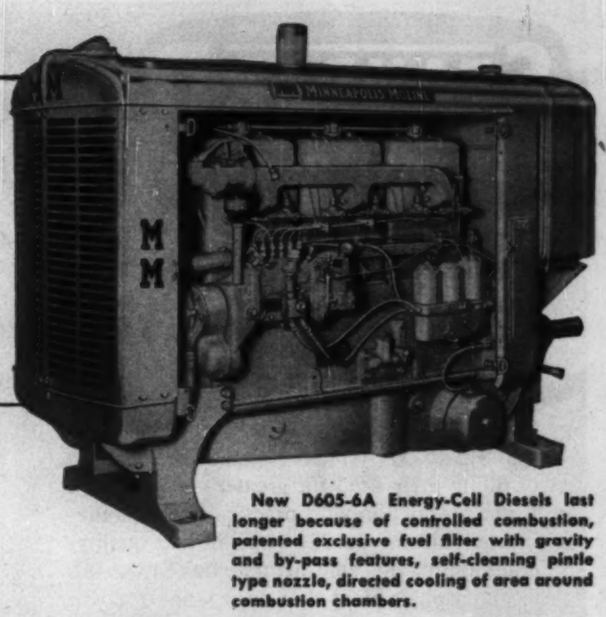
Time allowed: 300 working days. Liquidated damages, engineering expense for extra time for completing job

Highways

Primary Road System for Air Force Academy, Colo.

Clearing, grading and draining 9.3 mi of two- and four-lane roads for the primary road system of the Air Force Academy site 12 miles north of Colorado Springs, Colo. will cost $461,707. This contract with Nowers Construction Co. is with the Air Force Academy Construction Agency, Colorado Springs, Major T. E. Correll, contracting officer and assistant chief of staff, installations. Skidmore, Owings &

WHY IT PAYS TO OWN INDUSTRIAL DIESELS WITH REMOVABLE CYLINDER BLOCKS AND HEADS

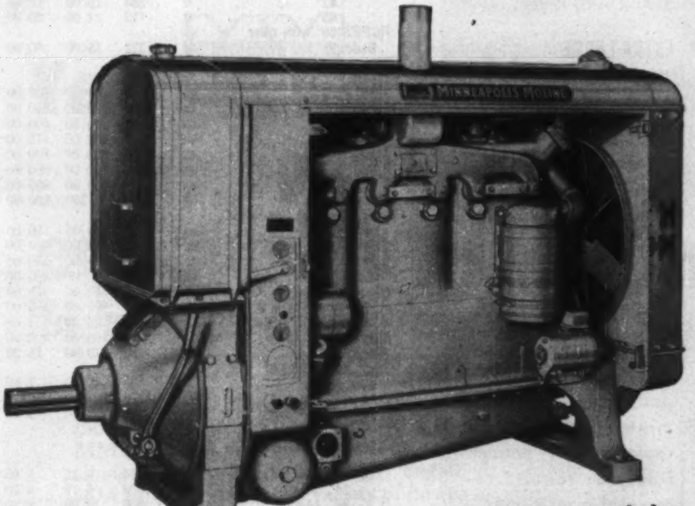


New D605-6A Energy-Cell Diesels last longer because of controlled combustion, patented exclusive fuel filter with gravity and by-pass features, self-cleaning pintle type nozzle, directed cooling of area around combustion chambers.

New MM diesels were developed with *energy-cells* to make them last longer, do more and go farther with less down-time and maintenance.

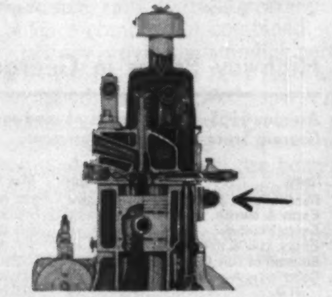
To provide owners with lower cost maintenance when necessary MM diesels are the most advanced and soundly engineered because the cylinder blocks are cast in pairs separate from the crankcase.

YOU GET THESE ADDED ADVANTAGES . . .

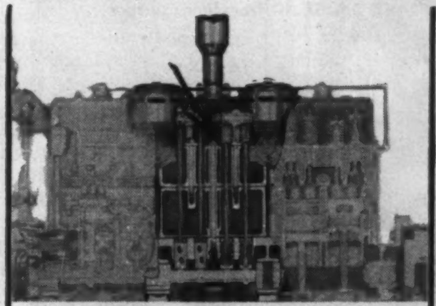


D605-6A equipped with Thermo-Clad base pan.

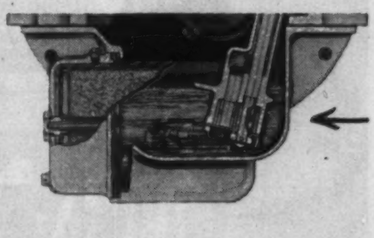
1. Ease of maintenance and low cost emergency service because paired cylinder blocks, pistons, and rods can be removed as a unit by one man.
2. Prolonged time between overhauls by use of close-grain cast iron that provides best cylinder lubrication for reduced wear.
3. Less service due to minimum distortion as MM cylinder heads, cylinder blocks and crankcase are virtually strapped together by full-length steel studs anchored in the main bearing bulkheads. (Transmits combustion pressure to heavy crankcase that has extra depth below center line of crankshaft.)
4. Efficient operation obtained by uniform cylinder expansion . . . the result of controlled cooling and long oil-cooled cylinder wall skirts below ring travel area.
5. "New engine" performance at extremely nominal cost can be obtained right in the field without special tools using factory matched cylinder blocks, pistons, pins, and rings. (Blocks are dowelled to crankcase to assure bore is square with crankshaft and pistons are precision fit to bore . . . equivalent to a factory job.)
6. Lower initial cost stems from high production parts by casting cylinder blocks in pairs separate from the crankcase.



1. Cylinder head and block assembly shows coolant entrance at hottest point first and extra long skirt wall construction.



2. Close-up of how MM cylinder heads and blocks and crankcase are tied into a single rigid unit with long studs.



3. A D283 feature is extra large oil filter enclosed in base pan, floating-screen oil pump intake, and pump located in bottom of base pan.

Optional Thermo-clad water-blanketed base pans for all units also have oil filter included to give more effective filtering.

INDUSTRIAL
MM
MINNEAPOLIS MOLINE
MODERN MACHINERY
DIVISION

MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA

STANDARD
ASPHALT PLANTS

MAKE ASPHALT FASTER—BETTER—CHEAPER, Because...

THE PLANT THAT'S
Paving the Nation

Contractors throughout the nation recognize that STANDARD Asphalt Plants do the best job of filling their need for greater capacity, and faster production with practically no maintenance. Join the parade of profit and quality-conscious paving contractors...buy STANDARD ...the asphalt plant that does MORE for you and your customers.

no bottlenecks

Every unit of a STANDARD Asphalt Plant is engineered to speed the flow of materials, cut man hours per batch and to increase capacity.

EXTRA-LARGE DRYER CAPACITY

Size-for-size, STANDARD dryers out-perform all others in capacity and efficiency. Internal design permits more aggregate to be exposed *longer* to more heated air.

OVERSIZED ELEVATORS

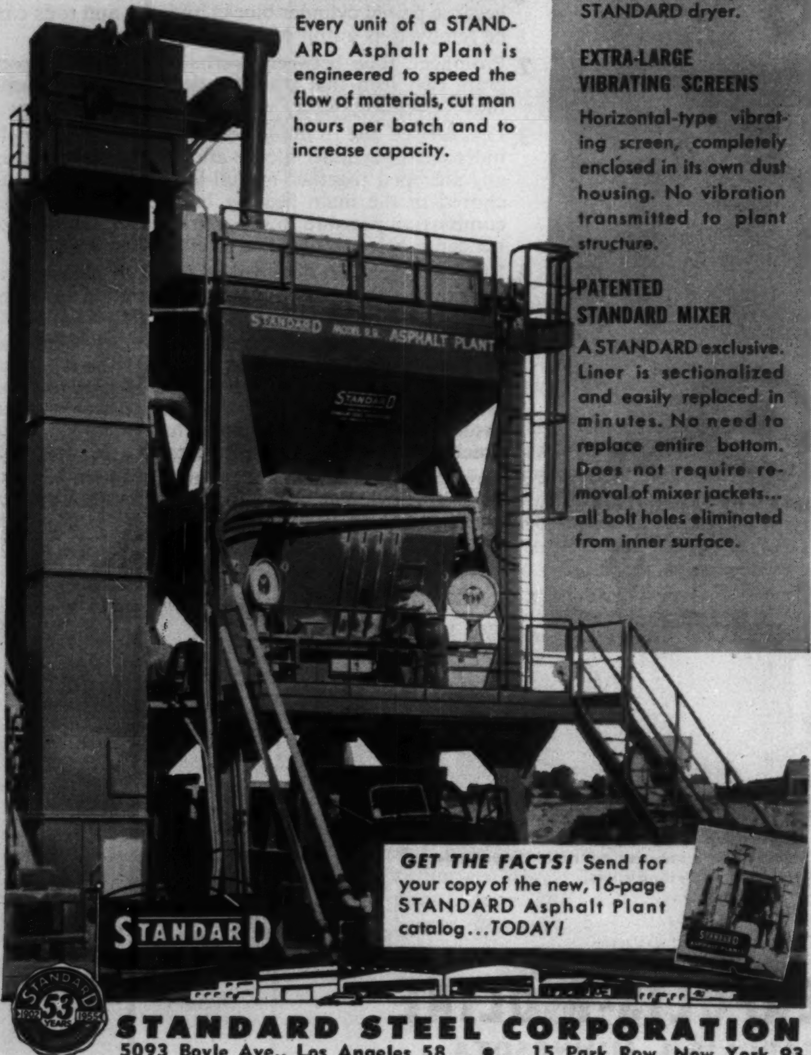
Elevators are of the vertical type with an extra-wide margin of capacity. Designed to handle the greater production capacity of the STANDARD dryer.

EXTRA-LARGE VIBRATING SCREENS

Horizontal-type vibrating screen, completely enclosed in its own dust housing. No vibration transmitted to plant structure.

PATENTED STANDARD MIXER

A STANDARD exclusive. Liner is sectionalized and easily replaced in minutes. No need to replace entire bottom. Does not require removal of mixer jackets... all bolt holes eliminated from inner surface.



GET THE FACTS! Send for your copy of the new, 16-page STANDARD Asphalt Plant catalog...*TODAY!*

STANDARD STEEL CORPORATION
5093 Boyle Ave., Los Angeles 58 • 15 Park Row, New York 93

Merrill, Chicago, are architects and engineers.

Both rail and highway transport are available to the site.

All materials are furnished by the contractor. Concrete must test at 3,000 psi at 28 days.

Minimum wages range from $1.75 for common labor through $1.90 for semi skilled to $2.50 and over for skilled trades.

Eight bidders include:

1B	Nowers Construction Co., Pueblo, Colo	$463,318
	1AC	461,707
2B	R. B. Potashnick, Cape Girardeau, Mo	475,885
	2A	470,716
8A	L. J. Hessel, Greeley, Colo	796,006
	8B	808,546

• B base bid • A CMP alternate • C contract

Bids: 6-1-55 Items	Unit	Quantity	Unit Prices 1C	 2
Clear, grub entire wk area	ls	job	$35,000	$20,000
Excavation	cy	537,000	0.48	0.45
Spot subgrade reinforcement	cy	300	3.00	5.00
Sub-base, 6" select matl	cy	29,000	1.55	3.00
Reinf conc structures				
Box culvert a	ea	1	10,700	14,000
Box culvert b	ea	1	8,500	20,000
Box culvert c	ea	1	6,500	8,000
Box culvert d	ea	1	4,000	6,000
Reinforced concrete pipe				
RCPSS 18"	lf	164	5.00	6.25
24"	lf	384	7.00	7.50
30"	lf	600	9.50	9.00
36"	lf	634	14.00	13.00
42"	lf	384	19.00	17.00
48"	lf	112	24.00	20.00
RCPES 66" with conc bedding	lf	312	45.00	60.00
Stnd headwall, single, conc				
18"	ea	3	200.00	200.00
24"	ea	5	300.00	350.00
30"	ea	10	400.00	400.00
36"	ea	7	500.00	475.00
42"	ea	6	600.00	700.00
48"	ea	4	700.00	900.00
66"	ea	4	950.00	800.00
triple, conc 36"	ea	2	1,200	900.00
Stnd intercept headwalls				
conc 18"	ea	1	300.00	150.00
24"	ea	5	400.00	160.00
36"	ea	3	600.00	250.00
42"	ea	2	700.00	300.00
Median inlet, type A	ea	3	600.00	375.00
type B	ea	7	800.00	375.00
Rock for slope protection	cy	500	25.00	5.00
Sheet & bracing lip	Mfbm	1	500.00	300.00
Riprap	cy	60	40.00	15.00
Pipe sub-drain, 6", perf clay	lf	100	12.00	2.50
Pipe sub-drain, 6", clay sewer	100	100	12.00	2.25

Alternate Drainage Pipe

CMP 18", 14 gage	lf	164	4.25	5.50
24", 14 gage	lf	384	6.10	6.50
30", 14 gage	lf	600	10.00	8.50
36", 14 gage	lf	634	13.00	12.00
42", 12 gage	lf	384	18.00	16.00
48", 12 gage	lf	112	23.00	18.00
66", 10 gage	lf	312	44.00	50.00

Highway Prices in Georgia

Average 1955 low bid prices of roadway items, Georgia State Highway Department.

Items	Unit	Letting Dates May 6	 June 24
Random clear & grub	acre	$70.00	$62.50
Excav & borrow, uncl	cy	0.22	0.22
Excav channel	cy	0.65	0.65
Excav, culv & minor struct	cy	1.25	1.15
Sel matl bf culv foundation	cy	2.85	2.60
Concrete cl A	cy	39.00	38.00
Cl B	cy	42.00	41.00
Conc steps, incl reinf steel, cl B	cy	58.00	58.00
Bar reinforcing steel	lb	0.11	0.11
Pipe SD 15"	lf	2.00	2.00
18"	lf	2.40	2.45
24"	lf	3.60	3.50
30"	lf	4.75	4.75
Pipe CD 15"	lf	2.58	2.70
18"	lf	3.00	3.00
24"	lf	4.35	4.50
30"	lf	5.70	5.75
36"	lf	7.80	7.70
42"	lf	10.00	10.00
48"	lf	11.75	11.75
54"	lf	18.75	18.75
60"	lf	21.00	21.00

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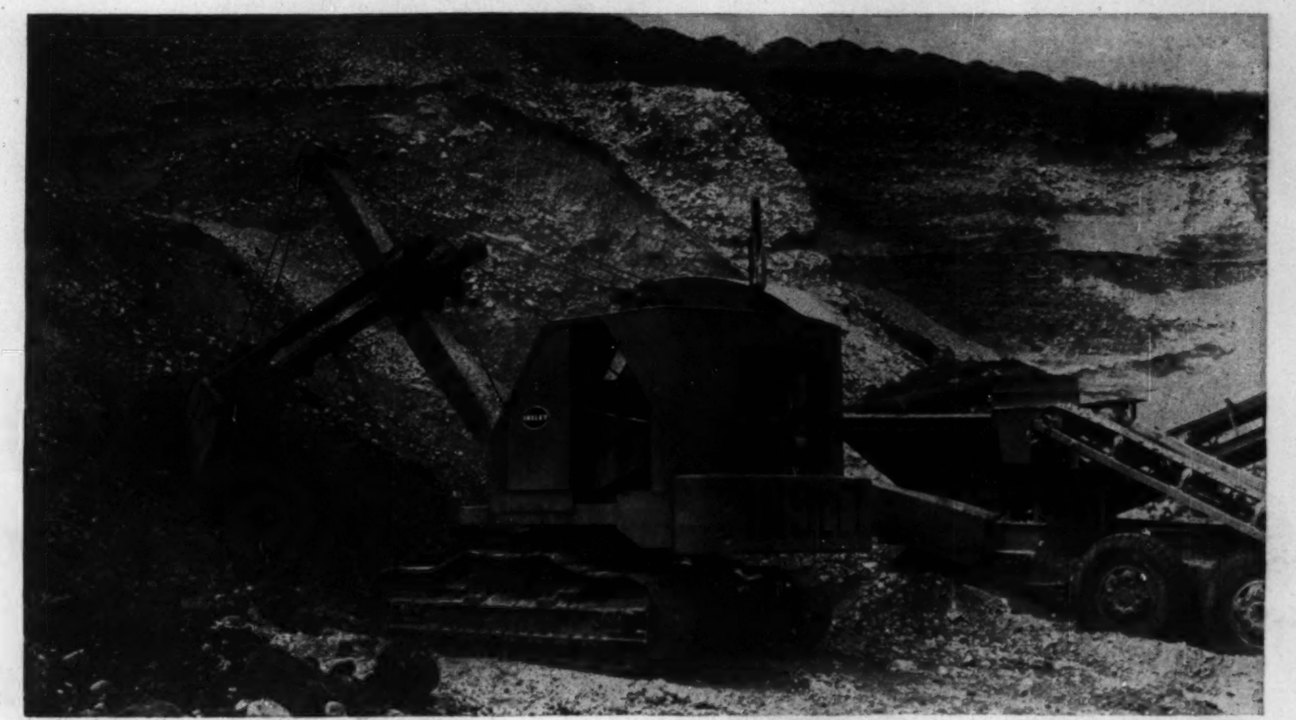
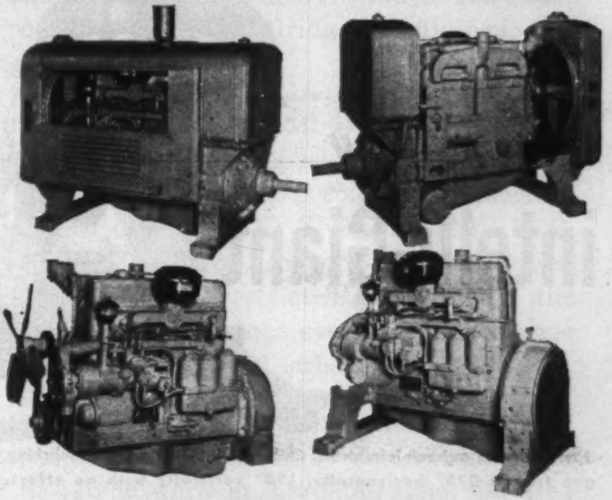


Yes, MM Engines are built and equipped to order



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You get power adaption that fits your specifications more readily with Minneapolis-Moline engines. Why MM? Because, as an independent engine builder, no single sales outlet dictates MM engine design—and MM works in such a big variety of power applications.

To meet a wide range of basic requirements MM engines have large displacement for high torque at moderate rpm. Extra high compression and high turbulence combustion combined with high volumetric efficiency provide outstanding performance.

For these reasons MM units are ready to go when equipped with specified operating accessories. You eliminate major auxiliary unit purchases to adapt engine characteristics to meet momentary high load demands. Further long run benefits are low fuel consumption and low maintenance that total up to low cost production.

Every-day experience in supplying a wide range of unit requirements enables MM to maintain customary high quality in single or small lot quantities at reasonable cost.

A high degree of standardization results in high production parts that provide precision fits and permit MM to schedule parts for special units in large quantity, assuring early delivery and customer service.

MM engines are completely engineered and equipped for gasoline, LP gas, natural gas, or distillate fuels. Sizes range from 206 cu. in. portable units to 1600 cu. in. stationary engines and are available for fan to flywheel application or completely enclosed leg mounted installations. MM also builds a line of industrial Diesel power units: Sizes—283-, 425-, 605 cu. in.

Standard equipment includes vacuum crankcase ventilation, thermostat controlled bypass cooling, packaged water pump, built in variable speed governors, enclosed gear driven oil pump, and oversize full-flow oil filters (shunt-type filters are provided exclusive on MM Thermo-Clad units).

Send details on your application for examples of MM built-to-order packages for original or replacement needs. Engineering service available for pumps, hoists, crushers, generators, shovels, ditchers, cranes, compressors, feed mills, saw mills, planing mills and similar installations. When you want dependable performance year after year from your engine, you want an MM Industrial Power Unit.

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MODERN MACHINERY
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MINNEAPOLIS-MOLINE MINNEAPOLIS 1, MINNESOTA

Increase yardage 25%
—yet cut slurry costs!

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intelli-Giant

Operated with automatic controls, Chiksan's Intelli-Giant hydraulicking gun travels 270° horizontally, 120° vertically with no effort.

Operating at 30 to 300 lbs. pressure, the Chiksan Intelli-Giant helps feed solids in direct ratio to the Slurry pump's maximum capacity and efficiency. In Florida's phosphate fields, companies using the Intelli-Giant are increasing yardage moved by some 25%. And when handling 800 to 1000 tons per hour at a ratio of 40% solids, this increase in production amounts to hundreds of dollars daily.

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Get the facts on the Chiksan Intelli-Giant for your operation.

For detailed information write today to Dept. 239

intelli-Giant

CHIKSAN intelli-Giant

CHIKSAN COMPANY • *Subsidiary of Food Machinery and Chemical Corporation*
Brea, California • Chicago 3, Illinois • Newark 2, New Jersey
Well Equipment Mfg. Corp. (Division) Houston 1, Texas • Chiksan Export Company, Brea, Calif.; Newark 2, New Jersey, Chiksan of Canada Ltd., Edmonton, Alta.

fmc

Highway Prices in Georgia

Continued from preceding page

Items	Unit	Letting Dates May 6	Letting Dates June 24
Culvert pipe removed	lf	0.60	0.55
Relaid	lf	0.65	0.65
Plain rip rap	sy	4.95	5.00
Concrete R/W markers	ea	4.65	4.65
Seeding	sy	0.04	0.05
Sprigging	sy	0.03	0.03
Loose sod	sy	0.45	0.50
Block sod	sy	0.70	0.60
Sod ditch checks	sy	0.55	0.55
Fertilizer, first application	ton	50.00	50.00
Second application (nitro. cont)	lb	0.25	0.25
Local matl base or surf	cy	0.43	0.45
Selected material shoulders	cy	0.50	0.50
Subgrade treatment material	cy	0.40	0.40
Overhaul on local material . . ½ mile	yd	0.03	0.03
Cutback asphalt prime	gal	0.15	0.15
Single surf treatment, type 1	sy	0.17	0.17
Liquid seal	sy	0.11	0.11
Concrete sidewalk 4"	sy	2.90	2.75
6"	sy	3.85	3.75
Perforated pipe underdrain 6"	lf	1.30	1.30
Remove cl A concrete	cy	$15.00	$15.00
Cl B concrete	cy	7.50	7.50
Concrete valley gutter, 6"	sy	5.00	5.00
Concrete gutter with RE, 6"x30"	lf	1.75	1.75
Comb conc curb & gutter, 6"x30"	lf	2.00	2.00
Grading per mile	pm	400.00	400.00
Machine grading	pm	425.00	425.00
Preparation of base	pm	450.00	450.00
Reinf conc approach slab	sy	9.70	9.75
Concrete slope drain	lf	3.00	3.00
Slope drain, 8"	lf	2.00	1.90
10"	lf	2.10	2.15
Catch basins, H-4' or less	ea	150.00	150.00
Addl depth catch basins	lf	20.00	15.00
Guard rail incl posts	lf	3.80	3.75
Finishing & dressing	sy	0.02	0.015
Drop inlets, H-4' or less	ea	125.00	125.00
Addl depth drop inlets	lf	22.50	10.00
Asphalt tack coat	gal	0.15	0.15
B-binder, & hot	ton	4.80	4.80
Asphaltic concrete "E"	ton	4.57	4.57
Asphaltic material AC 8	gal	0.11	0.11

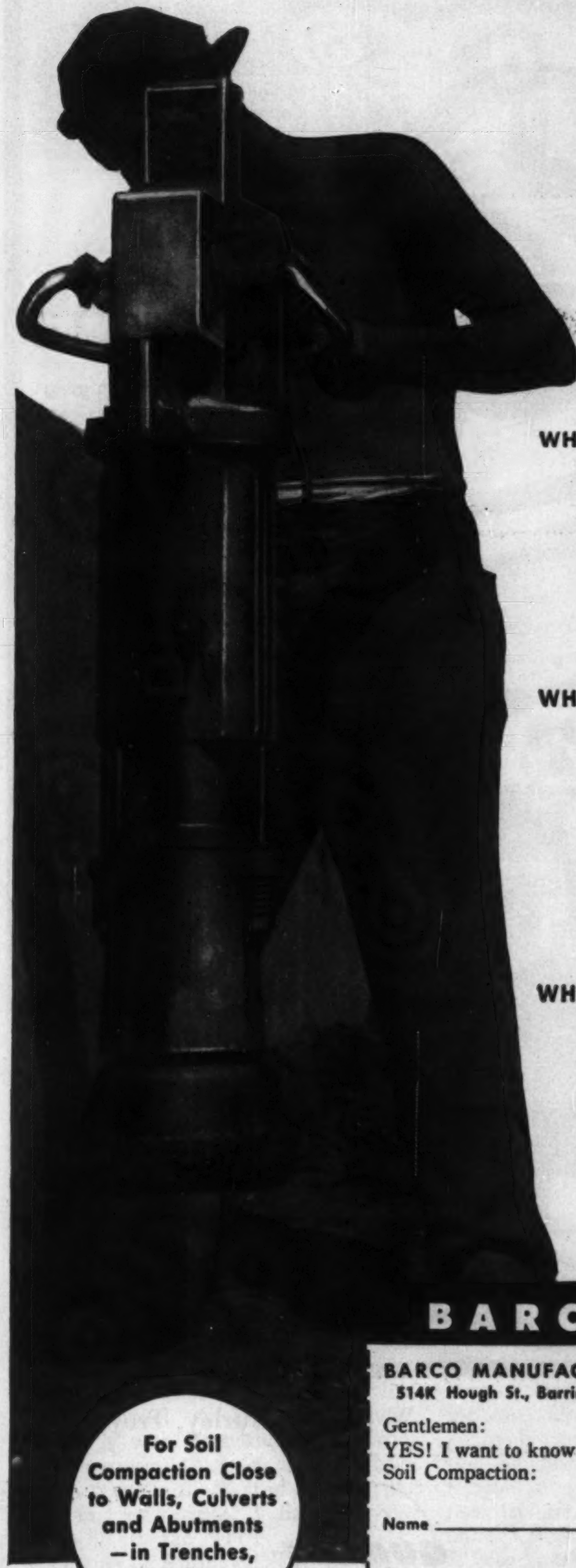
Highway Prices, Oregon

1954 average contract unit prices reported by Oregon State Highway Department

Item	Unit	AveragePrice 1954 City Proj	AveragePrice 1954 All Proj
Excavation, structural	cy	$4.05	$2.97
drainage	cy	2.65	2.15
single class	cy	1.12	....
borrow	cy	1.00	....
Short overhaul	stay	0.03	0.007
Blade grader	hr	11.48	10.14
Concrete pipe, sewer 8"	lf	1.18	1.38
10"	lf	2.00	2.00
12"	lf	2.06	2.12
18"	lf	3.16	3.20
24"	lf	5.00	5.00
culvert 12"	lf	2.48	1.92
18"	lf	4.00	3.34
24"	lf	6.00	4.48
Metal pipe, perf. drain 6"	lf	2.00	1.56
Drain pipe, coated 12"	lf	3.00	3.32
Culvert pipe 12"	lf	3.09	3.05
Arch type pipe 43" x 27"	lf	20.00	20.00
Xtra to instl pipe under pave	lf	1.00	1.79
Special backfill in drains	cy	6.00	....
Selec roadbed topping	cy	1.81	1.30*
Material in base, coarse	cy	1.53	0.95
4"–0"	cy	1.50	1.50
3"–0"	cy	2.71	1.93
2½"–0"	cy	2.95	....
¾"–0"	cy	3.57	2.00
Sprinkling	Mgal	3.40	2.03
Asphalt in tack coat, RS-1	t	57.22	45.82
in binder crs RC-3	t	53.86	40.32
MC-2	t	56.59	42.53
Mat in binder course ¾"–0"	cy	4.76	3.00
cushion course ½"–0"	cy	4.80	....
Asphaltic concrete Cl C	t	8.12	6.08
Cl B	t	8.24	5.50
Portland cement conc pave	sy	3.70	3.70
Expansion joints in pavement	lf	0.35	0.35
Contraction joints in pavement	lf	0.18	0.18
Dowel bars, ¾" x 18"	ea	0.70	....
Asph concrete traffic markers	lf	0.97	1.14
Concrete catch basins	ea	72.10	72.10
Curbs	cy	42.46	36.10
Driveways	sy	4.00	3.84
Walks	sy	2.85	3.00
Expansion joints in walks	lf	0.20	0.20
Concrete manholes	ea	262.50	253.71
Adjustment of catch basins	ea	20.00	22.17
manholes	ea	31.39	38.52
Reconstr of catch basins	ea	200.00	200.00
Removal of curbs	lf	0.21	0.23
concrete and masonry	cy	30.00	20.00
pavement	sy	0.65	0.38
pavement and walks	sy	1.43	1.43
walks and driveways	sy	0.35	0.41

* Incl haul

WHEN CONSTRUCTION JOBS CALL FOR SOIL COMPACTION



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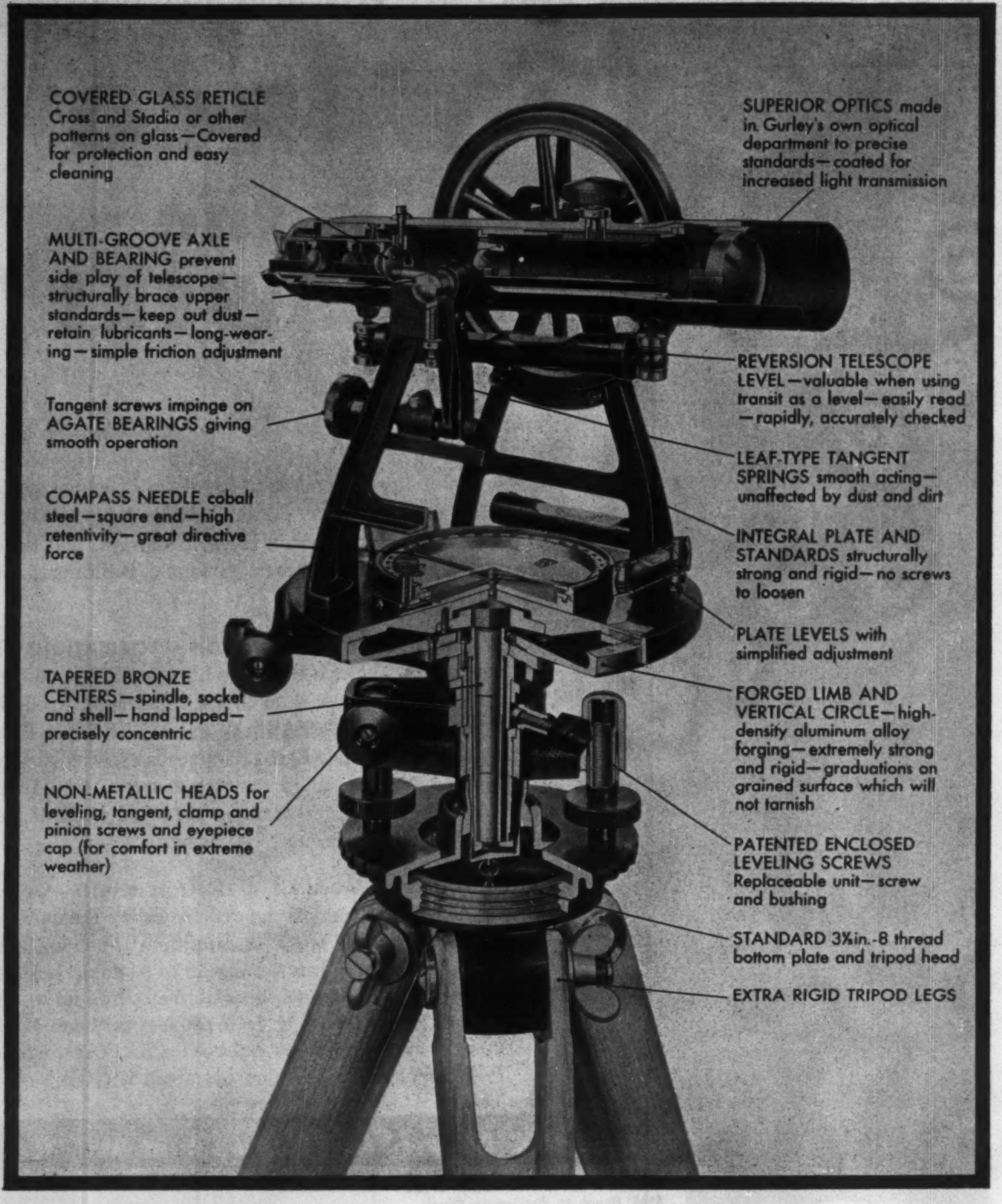

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STANDARD 3½in.-8 thread bottom plate and tripod head
EXTRA RIGID TRIPOD LEGS

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GURLEY

Highway Bid Price Trends in New York

Selected unit prices for 1948-54 showing weighted averages of contract prices, Department of Public Works, Division of Construction, State of New York.

Items	Unit	1948	1949	1950	1951	1952	1953	1954
Applying water	Mgal	$2.61	$2.16	$1.77	$1.71	$1.73	$2.04	$2.16
Excavation uncl	cy	0.68	0.65	0.72	0.63	0.89	.....	.....
with moisture control	cy	0.52	0.61	0.49	0.57	0.55	0.88	0.70
trench, culv & bridge	cy	2.35	3.40	2.22	2.35	2.79	4.01	4.49
Overhaul	sy	0.006	0.004	0.006	0.006	0.0038	0.0021	0.0057
Trimming road section	lfrd	0.32	0.37	0.37	0.29	0.41a	0.47a	0.51
Preparing fine grade	sy	0.18	0.21	0.20	0.20	0.26	0.31	0.27
Sewer pipe vit 4"	lf	0.65	0.61	0.94	0.98	1.19	1.50	1.53
6"	lf	1.63	1.32	1.51	1.64	1.66	2.00	1.40
8"	lf	1.69	1.77	1.70	2.45	1.87	2.50	1.39
10"	f	2.46	1.93	2.91	3.46	.....	3.06	3.00
12"	lf	3.28	2.53	2.91	3.45	5.25	3.26	2.37
15"	lf	4.00	3.36	3.91	4.47	5.00	5.06	3.72
18"	lf	4.89	5.26	5.04	5.55	7.00	.....	7.00
24"	lf	6.15	7.54	7.89	9.47	13.00	15.00	7.00
Underdrain VCP 4"	lf	0.78	1.01	0.85	1.25	0.77	0.98	0.99
6"	lf	1.17	1.18	1.06	1.41	1.06	1.22	0.95
C or V opt 4"	lf	0.89	1.14	0.73	1.07	1.14	0.88	1.01
6"	lf	1.15	1.31	1.33	1.23	1.01	1.28	1.03
Cor met pipe heavy 12"	lf	3.88	4.14	3.41	3.56	4.13	4.74	4.14
15"	lf	5.13	4.56	3.73	3.96	5.00	5.95	5.26
18"	lf	6.31	5.30	4.66	5.31	4.98	6.69	5.89
24"	lf	8.31	7.68	7.75	8.63	8.33	10.04	8.20
30"	lf	10.36	9.69	10.70	10.00	12.74	16.16	12.88
36"	lf	12.61	11.55	13.50	15.00	15.95	17.84	15.00
42"	lf	14.73	13.00	16.50	25.00	17.00	20.00	19.61
Cast iron pipe 6"	lf	6.80	4.55	4.23	5.09	4.03	4.77	4.94
8"	lf	4.67	4.95	5.06	6.89	5.55	5.78	5.40
10"	lf	7.01	5.75	6.81	.....	6.19	7.00	8.32
12"	lf	8.33	7.01	7.29	9.81	7.59	8.19	7.21
16"	lf	12.11	8.48	6.48	12.45	.....	8.95	9.69
18"	lf	8.89	11.78	10.08	12.79	15.72	10.03	13.48
20"	lf	12.93	16.11	11.67	11.02	18.11	11.42	13.86
24"	lf	15.11	16.09	11.85	22.64	28.31	22.30	14.82
36"	lf	16.00	26.00	24.84	28.00	.....	41.85	.....
Reinf conc culv pipe 12"	lf	2.93	3.43	3.40	3.78	4.00	4.14	4.20
15"	lf	3.91	3.99	3.32	4.54	4.30	4.42	5.28
18"	lf	5.75	5.31	4.87	5.44	5.77	6.18	5.86
21"	lf	5.44	6.70	5.90	6.35	7.87	7.60	8.21
24"	lf	7.92	7.57	6.80	7.90	8.16	8.84	8.49
30"	lf	11.12	10.56	9.48	11.42	12.27	12.32	12.08
36"	lf	15.23	13.09	11.96	13.53	14.37	14.81	14.68
42"	lf	16.91	18.76	14.62	16.60	18.41	18.93	18.22
48"	lf	18.04	20.04	18.90	19.74	22.48	23.37	23.96
54"	lf	27.68	29.09	19.02	24.44	26.21	27.89	26.74
60"	lf	25.74	30.11	25.00	30.65	30.27	32.43	31.94
72"	lf	40.00	44.65	40.00	41.28	42.45	48.27	41.55
Reinf conc sewer pipe 12"	lf	2.58	2.79	2.97	3.87	4.16	3.76	3.64
15"	lf	3.53	5.72	3.68	4.75	4.90	4.70	4.91
18"	lf	4.02	4.55	4.28	5.44	5.83	5.96	5.25
21"	lf	5.24	4.50	5.20	9.15	6.63	.....	.....
24"	lf	6.14	6.60	5.84	8.33	7.85	7.83	7.35
30"	lf	9.86	9.36	7.41	10.00	.....	11.63	10.26
36"	lf	9.04	11.92	10.80	11.25	14.30	13.29	13.54
Portland cement:								
Type 2	bbl	3.64	3.76	3.58	3.90	4.20	4.34	4.34
Type 2A	bbl	3.32	3.45	3.58	4.06	4.09	4.39	4.43
Type 3	bbl	4.99	4.44	4.33	5.00	5.00	4.68	4.49
Type 6, 6A	bbl	8.53	8.49	5.43	10.00	9.99	9.53	11.04
Type N	bbl	4.05	4.21	3.89	4.26	4.40	4.37	4.90
Conc for struct cl 1A	cy	39.85	41.73	39.32	46.26	52.87	57.92	49.06
for railings	cy	108.47	133.31	88.67	94.53	125.64	137.91	135.77
Cl 1	cy	35.58	36.93	33.48	38.00	45.47	46.18	46.23
Cl 2	cy	36.40	27.02	27.68	43.05	43.65	46.17	34.18
Cl 3	cy	34.72	24.10	26.84	35.48	27.91	30.87	31.63
Masonry, stone	cy	130.14	145.38	133.89	139.05	140.44	153.90	160.66
Rub stone, ld with mortr.	cy	42.17	50.09	46.03	48.31	48.09	59.36	65.60
laid dry	cy	18.51	55.93f	22.05	30.61	41.72	50.97	35.96
Metl reinf, conc pave	sy, p	0.56	0.57	0.52	0.66	0.66	0.76	0.86
Steel fab reinf, 6x6—#6ga.	sy	0.51	0.55	0.54	0.67	0.69	0.74	0.71
Bar reinf, conc pave	lb	0.11	0.12	0.11	0.141	0.152	0.141	0.162
Opt. trans jt supports	lfjt	0.90	0.93	0.92	1.12b	2.41	1.69c	1.79
Longitj t supports, opt	ea	0.20d	0.29d	.....	0.83	0.80	0.80	0.82
Bar reinf for structures	lb	0.118	0.126	0.114	0.133	0.133	0.139	0.139
Spiral bar reinf	lb	0.58	0.87	0.80	1.09	0.91	0.82	0.71
Structural steel	lb	0.151	0.143	0.16	0.174	0.18	0.187	0.172
Misc metals	lb	0.21	0.24	0.20	0.221	0.27	0.270	0.27
Pile shoes, f&p	ea	8.36	8.23	8.61	6.67	8.22	15.00	.....
Opt. guide railing	lf	1.98	2.15	1.99	2.28	2.48	2.82	2.98
Opt. guide posts	ea	7.46	8.20	8.23	8.23	8.78	9.03	9.15
Found crse ROB gravel	cy	1.60	1.64	1.33	1.33	1.69	1.87	2.44
screened gravel	cy	4.00	5.14	6.50	.....	.....	.....	.....
broken stone	cy	4.17	5.67	5.25	4.10	7.26	7.00	6.50
ROB grav slag or ROC stone Opt	cy	5.00	3.63	2.32	3.80	6.50	.....	3.61
Bott. crse broken stone	cy	7.25	6.07	6.40	7.22	7.27	7.12	6.77
bit mac pen meth asph.	cy	7.30	6.72	6.41	8.07	8.41	8.10	8.08
Conc foundn for pave	cy	9.73	10.25	8.64	10.97	10.00	11.23	12.46
Cement concrete pavement	cy	10.17	10.96	9.35	10.64	10.96	12.32	12.63
with carbon black	cy	11.63	12.63	10.34e	12.92	12.32	12.92	14.76
Cement concrete pavement	cy	14.44	14.10	13.73	12.95	12.94	16.70	17.10
with carbon black	cy	15.08	15.40	10.00	14.11	13.25	15.00	16.82
two-course	cy	10.85	12.89	9.79	10.78	13.00	11.00	11.72
Asphalt concrete Type 2A	t	11.17	9.24	9.88	10.50	10.92	11.15	11.52
Opt.	t	8.87	9.56	10.00	.....	10.04	10.82	10.06
Top crse gr grav bit double surf treat	cy	2.03	3.18	2.36	3.28	3.63	5.45	5.26
Bit mac type 1 pen method hot asph	cy	8.00	7.56	7.94	8.38	8.20	9.74	8.04
Bit mat dampproofing	gal	1.08	1.17	1.00	1.23	1.13	1.24	1.00
Membrane waterproofing	sy	2.90	2.60	1.85	2.53	2.09	1.89	1.73
Prot crse for membr waterproofing	sy	4.13	3.98	2.96	2.92	3.25	2.46	4.03
Bit mat, A paving	gal	0.183	0.18	0.162	0.171	0.181	0.184	0.184
T road tar	gal	0.193	0.19	0.22	0.207	0.224	0.246	0.215
T road tar	gal	0.195	0.20	0.20	0.208	0.23	0.257	0.244
Stone filling	cy	3.52	3.79	3.72	4.77	7.34	7.77	5.37
Dry stone paving, joints filled with sand	sy	4.14	4.35	4.46	4.55	5.37	5.83	6.32
Riprap dry	cy	11.53	14.89	9.25	9.42	13.09	13.70	13.97
grouted	cy	12.70	24.51	11.27	20.78	16.29	18.73	17.44
Sheet piling timber	sf	0.81	1.08	0.54	0.94	0.88	1.24	0.71
temporary	sf	0.42	0.50	0.26	0.32	0.40	0.64	0.70
Timber piles, untreated	lf	1.66	1.63	1.47	1.52	2.03	2.32	1.69
creosoted	lf	3.04	2.30	2.74	2.90	3.04	3.37	2.26
Piles, steel bearing:								
10" HP @ 42#	lf	5.00	4.34	3.98	5.31	4.91	5.47	5.11
12" HP @ 53#	lf	5.14	5.07	5.08	6.90	5.36	5.30	4.00
10" WF @ 66#	lf	7.50	4.50	.....	.....	.....	.....	6.50
Conc, 12" x ¼" shell cip	lf	4.15	5.35	4.65	.....	5.78	5.94	5.05
Cleaning existing pave.	mi	146.40	153.88	96.26	124.30	144.43	139.84	112.57
Cleaning existing pave.	sy	0.066	0.13	0.19	0.09	0.058	0.12	0.091
Screened gravel LM	cy	6.65	5.53	4.08	3.46	4.35	5.16	5.06
Broken stone LM	cy	4.38	5.21	5.36	5.24	6.73	6.47	5.27
Stone curb & headers	lf	5.44	4.41	4.75	5.75	4.96	5.10	4.97
Resetting old curb	lf	2.42	2.75	3.47	2.53	2.40	3.23	2.02
Concrete curb Type A	lf	0.74	0.70	.....	.....	.....	.....	.....
Type B	lf	1.44	0.89	.....	.....	.....	.....	.....
Type C	lf	1.50	1.78	1.87	1.97	2.80	2.48	1.51
Type D	lf	1.00	1.59	.....	.....	.....	.....	.....
Type E	lf	2.61	2.25	.....	.....	.....	.....	.....
Type F	lf	0.85	1.12	.....	.....	.....	.....	.....
Reflecting conc curb, 9" W x 9" to 12" deep	lf	0.75	2.75	1.79	1.36	0.92	0.90	1.75
conc mall, 4'0" W x 0–12½" deep	lf	3.07	3.57	3.33	3.50	3.50	5.00	3.50
Concrete gutters	sy	3.79	4.27	4.02	4.51	4.98	5.40	5.14
Catch basins, MH & drop inlets	cy	72.35	68.04	67.36	71.39	70.34	78.13	71.91
Altering MH & CB	ea	28.38	44.58	48.05	43.00	48.00	44.07	49.44
Concrete ROW markers	ea	5.76	6.19	5.00	7.42	8.85	9.24	9.45
Concrete sidewalk, 6"	sy	3.57	3.94	3.66	4.85	4.74	4.79	4.70
Timber & lumber	Mfbm	231.89	212.66	160.04	191.85	221.81	237.00	232.23
stress graded	Mfbm	253.95	235.85	217.64	500.00	301.89	400.00	357.24
creosoted	Mfbm	265.07	268.02	317.27	400.00	332.06	493.29	506.51
Relaying old pipe	lf	1.75	1.97	1.90	2.02	2.23	2.57	2.14
Pneu projected conc	sf of f	1.53	1.59	1.13	1.47	1.73	0.93	1.50
Emuls carbon black	lb	0.102	0.106	0.098	0.120	0.138	0.134	0.111
Highway RR barricade	lf	10.85	6.63	8.86	6.29	8.18	8.14	8.22
Top crse bit mac opt asph cutback road mix	t	4.71	4.43	3.50	4.33	4.10	5.53	4.50
Bit mat A cutback	gal	0.189	0.18	0.16	0.165	0.185	0.191	0.17
ROB gravel fill	cy	2.22	2.34	2.11	1.94	2.35	2.58	2.95
Reflect hwy–RR xing signs	ea	87.50	171.25	205.00	112.50	147.50	202.50	180.56
Top soil, f&p	cy	1.90	2.37	2.86	3.38	3.73	4.16	3.29
Furnishing seed & seeding	acre	246.45	229.55	286.84	325.41g	297.51	325.42	319.92
Ground prep with soil amends fert furn seed & seeding & mulch	acre	489.35	353.40	234.87	368.74	612.91	.....	.....
Sod & sodding	furn sy	1.37	1.50	1.27	1.18	1.27	1.45	1.55
Mulch & mulching	furn acre	142.23	230.07	158.24	65.69h	152.16	200.00	.....
Topsoil from stock piles	cy	1.25	1.10	0.98	0.85	1.02	1.12	1.14

*a Thruway $0.54–1952; $0.73–1953 *b Old standard, $2.41 new standard *c 4 new, lighter & cheaper types of trans jt supports allowed in 1953 *d Lin ft of joint *e Incl 1 contract of 39,100 cy @ $9.47 per cy *f Incl 6 contracts ranging in price from $50.00 to $90.00 per cy *g Incl 1 contract of 100 acres @ $295.00 per acre *h Incl 1 contract of 100 acres @ $55.00 per acre

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Canton Land Section Patapsco Tunnel, Maryland

The $5-million contract for the Canton land section of the Patapsco Tunnel under Baltimore's main harbor channel, awarded to Leo Butler Co, is with Maryland State Roads Commission, Norman M. Pritchett, chief engineer. Consultants on the tunnel are Singstad & Bailey of New York, on the whole project J. E. Greiner of Baltimore. This section of the project will provide access to the $29.8 million twin-tube tunnel section already under construction. (See unit prices, ENR 3-31-55, page 104.)

Work on the Canton land section consists of 440 ft of open ramp, 1,025 ft of tunnel, the foundations and first floor of the Canton ventilation building and railroad relocation and temporary bridges. The Canton ventilation building foundations are offline to avoid interference with existing railroad facilities. Most of the work is under water.

Wage rates prevailing in Baltimore include: carpenters $2.75, structural ironworkers $3.325 including fringe benefits, reinforcing ironworkers $3.075, common labor $1.675, electric workers $3.075, all including fringe benefits, tractor operators $2.85-3.00, truck drivers $1.675-1.925.

The bidders include:

1	Leo Butler Co., College Park, Md	$5,030,513
2	Baltimore Contractors, Inc., Baltimore, Md.	5,138,652
3	Square Construction Co., Baltimore, Md	5,795,383

Bids: 8-11-55 Items	Unit	Quantity	Unit Prices 1C	 2
Exc, tunnel structures	cy	159,000	$4.44	$5.00
trenches	cy	5,800	3.50	5.00
Test piles	lf	160	10.70	10.75
Pile load tests	ea	5	2,140	2,150
Cast in place conc piles	lf	75,300	4.80	5.00

Continued on following page

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Patapsco Vehicular Tunnel
Baltimore, Maryland

Continued from preceding page

Bids: 8-11-55 Items	Unit	Quantity	Unit Prices 1C	Unit Prices 2
Concrete, type 1	cy	59,800	28.70	26.00
type 3	cy	3,800	50.00	40.00
Reinforcing bars	lb	4,400,000	0.0965	0.10
Wire mesh	lb	33,600	0.1425	0.15
Pneumatic mortar	sf	1,200	1.40	3.20
Structural steel	lb	3,850,000	0.132	0.11
Castings, steel	lb	5,800	0.355	0.45
iron	lb	22,000	0.265	0.40
Steel curbs, type A	lf	800	5.75	9.00
type B	lf	2,530	2.65	5.00
type C	lf	2,530	4.80	4.30
Misc steel & iron	lb	37,500	0.42	0.80
Dampproofing	sy	1,400	1.45	1.50
Waterproofing,				
Membrane, 1-ply	sy	9,000	0.95	1.00
4-ply	sy	15,800	3.65	3.80
6-ply	sy	11,000	4.80	5.00
brick in mastic	cy	475	96.00	100.00
cement coat	ls	.....	1,190	1,300
Copper tubing, drains	lb	4,000	4.00	5.00
CIP, cement lined 6" d	lf	12	3.50	6.00
8"	lf	15	5.20	15.00
Galv wi pipe, 2½"	lf	78	1.90	5.00
3"	lf	30	2.40	8.00
4"	lf	1,510	3.20	12.00
5"	lf	30	4.50	15.00
6"	lf	720	5.80	20.00
8"	lf	420	8.60	25.00
Brass pipe, 2½"	lf	142	16.00	18.00
Rigid galv stl cond, 1"	lf	2,900	0.70	1.00
1½"	lf	8,500	1.15	1.00
2"	lf	3,200	1.60	1.50
3"	lf	140	2.60	3.00
3½"	lf	18,300	4.05	4.00
4"	lf	950	4.80	5.00
5"	lf	175	13.80	6.00
Rigid silicon bronze				
conduit, ¾"	lf	160	3.15	3.00
1"	lf	125	3.95	3.80
1½"	lf	625	5.25	5.00
2"	lf	350	7.45	6.00
3"	lf	200	15.40	9.00
CI boxes, type SL-6	lb	5,300	1.65	2.00
other types	lb	1,750	2.20	2.00
Bare copper groundg cbl	lf	4,700	1.05	1.00
Sixway VC ducts, 3½"	lf	475	3.65	3.00
Asb ebony frame & door,				
type A	ea	5	230.00	205.00
type B	ea	17	230.00	205.00
type C	ea	4	225.00	205.00
type D	ea	2	225.00	205.00
type E	ea	4	425.00	400.00
type F	ea	1	430.00	400.00
type G	ea	2	430.00	400.00
type H	ea	2	425.00	400.00
Install ceram glaze tile				
ceiling	sf	38,600	1.07	1.15
wall	sf	10,600	1.34	1.40
Cmt mortar bases	lf	950	1.60	1.70
ceiling coves	lf	2,100	1.60	1.70
Glazed terra cotta curbg				
f&i	lf	2,200	5.60	6.00
" f&i using veneer	sf	44,650	4.28	4.60
Extra glazed terra cotta blocks, furn & deliver	ls	.....	5,350	5,800
Split vit P gutter ling	lf	2,530	4.00	4.00
Granite masonry	ls	.....	123,900	170,000
Aluminum fences	lf	1,250	34.70	36.00
Street decking	sf	3,500	7.85	3.50
RCP drains, 24"	lf	1,060	9.80	15.00
30"	lf	185	10.80	20.00
36"	lf	1,045	14.25	30.00
Inlets, type A	ea	2	430.00	200.00
Drainage manholes	ea	8	790.00	400.00
CI wtr P, temp loc 3"	lf	170	3.70	5.00
20"	lf	600	15.10	35.00
perm loc 3"	lf	530	2.20	4.00
6"	lf	270	6.00	8.00
20"	lf	530	13.30	30.00
Tile elec ducts,				
4½" temp	lf	3,000	3.25	1.00
4½" perm	lf	2,160	4.35	1.00
Maint suppt & protect exist fuel oil P, 10"	lf	65	2.10	50.00
12"	lf	65	2.10	50.00
20"	lf	65	2.80	50.00
Temporary RR bridge #1	ls	.....	14,900	45,000
#2	ls	.....	31,600	70,300
Fill	cy	1,850	3.00	1.50
Pavement, Leland Ave	sy	3,500	3.75	8.00
fire access rd	sy	900	2.70	3.00
Removal, temp reloc & restoration RR tracks	ls	.....	85,075	125,000
CIP, cmt lined 12"	lf	55	7.80	15.00

COMPLETION DATES: Contractor must provide access to river tunnel, through land section in this contract, by October 1, 1956. Liquidated damages $500 per day.

Foundation and first floor of Canton Ventilation Building, part of this contract, must be complete by April 1, 1956, ready to complete building under another contract. Liquidated damages $500 per day.

Entire contract must be completed by March 1, 1957, liquidated damages $100 per day.

Liquidated damages apply separately to each section but in no case can exceed $500 per day in all.

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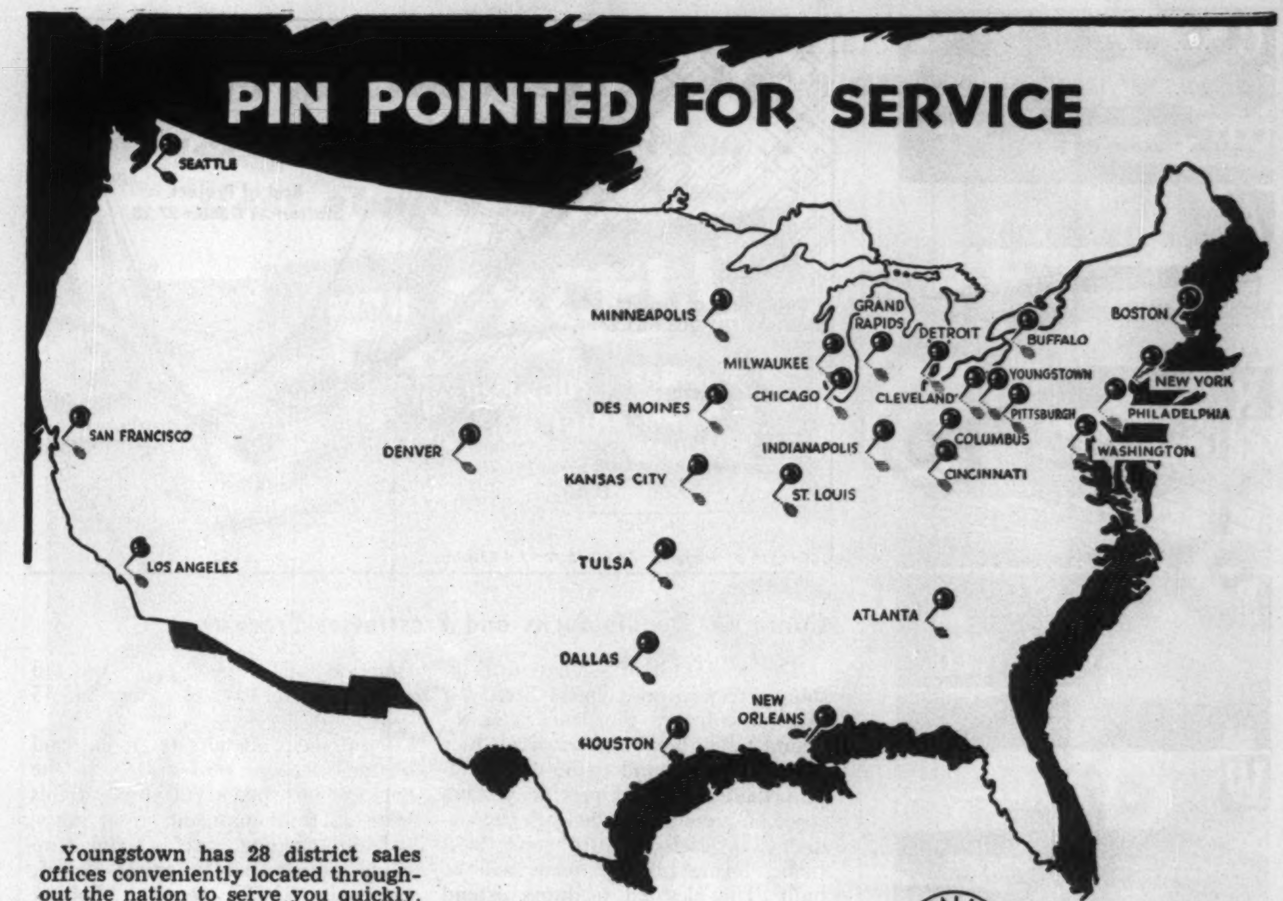
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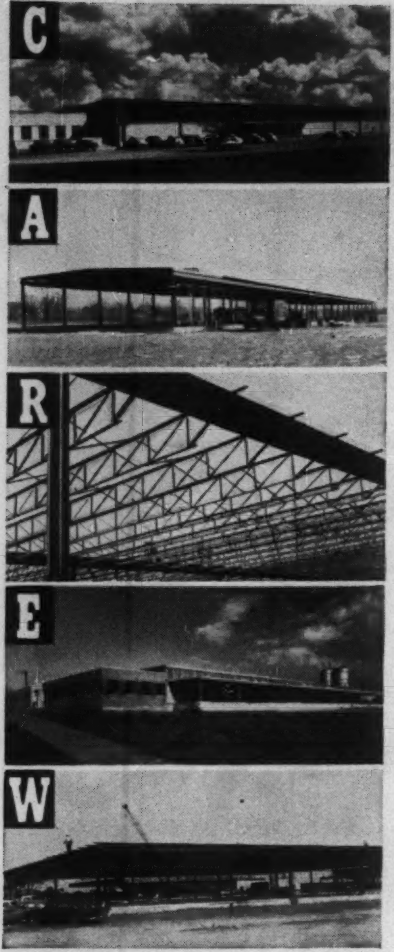

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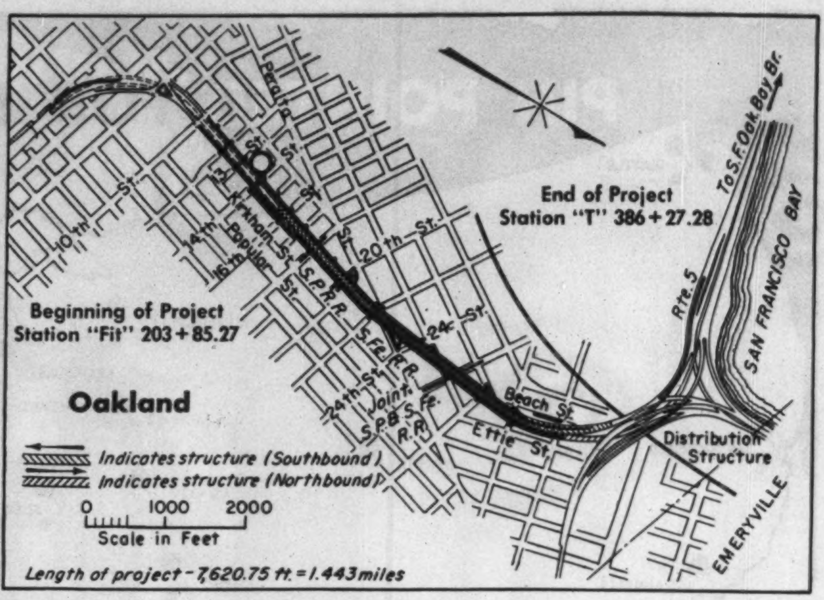

California Double-decks and Prestresses Freeway

The $5.9 million section of Eastshore Freeway on Cypress Street in Oakland will carry four lanes of southbound traffic on the upper level, four lanes of northbound traffic on the intermediate level and provide parking space on ground level beneath the viaduct. On each side, to serve local traffic, 3-lane frontage roads will be built. The elevated roadways extend southerly from the distribution structure along Cyprus Street to Sixteenth Street. From there this contract includes foundations only for another unit that will extend to Tenth Street. But all frontage roads in this contract will be built for the full length to Tenth Street. Major items of work include 56,000 cu yd of concrete in the double-deck, box girder structure, and 17 million lb of reinforcing steel. This is one of the largest single sections of state highway work to be awarded in California. G. T. McCoy is state highway engineer, B. W. Booker is assistant state highway engineer, district IV.

The low of ten bidders, Grove, Shepard, Wilson & Kruge of California, Inc., Seattle, took the contract at $5,878,249, 1.5 percent below the next and 11.5 percent below the high bidder.

"Improvements" to be removed from site include 1- and 2-story frame houses, metal and brick buildings, 1,000-gal underground storage tanks, fencing and spur track.

The state furnishes certain luminaires and finishing enamel. Otherwise the contractor furnishes and installs traffic signal systems, highway lighting and illuminated sign systems.

Concrete caps, 2,020 cu yd, are prestressed. Class A concrete in the bridge structure totals 54,000 cu yd was bid on a lump sum basis to average $45.55 per cu yd.

Equipment rental rates to be paid on force account work ordered by the engineer are shown elsewhere in this issue, in the equipment rental pages.

Minimum wage rates scheduled include asphalt plant engineer $2.845, carpenter $2.775, cement finisher $2.845, electrician $3.075, power shovel operator $3.175-3.285, reinforcing iron worker $2.85, tractor operator $2.845, truck driver, under 4 cu yd $2.10, 4-6 cu yd $2.24, unskilled labor $1.75.

In addition to other forms of insurance or bonds required, the contractor must carry Contractor's Public Liability for damage up to $400,000 and Contractor's Property Damage Liability up to a limit of $100,000.

Bidders include:

1C	Grove, Shepard, Wilson & Kruge of California, Inc., Seattle, Washington	$5,878,249
2	M. & K. Corp. & Piombo Const. Co., San Francisco, California	5,955,416
10	Williams & Burrows, Inc. & Carl N. Swenson Co., Inc., San Jose, California	6,637,473

Bids: 7-13-55 Items	Unit	Quantity	Unit Prices 1C	2
Remove conc, bridge	ls	job	$15,000	$17,000
bridge	cy	280	24.00	20.00
misc.	ls	job	12,000	35,000
pipe railing	lf	875	0.60	0.30
traffic stripes	lf	1,000	0.20	0.18
Remodel steel beams	ls	job	1,200	4,500
Devel wat sup & furn water equip	ls	job	4,000	3,500
Apply water	Mgal	2,530	2.30	1.75
Compact orig ground	sy	85,000	0.05	0.10
Exc. roadway	cy	50,000	0.90	1.20
" structure	cy	22,000	2.50	1.50
Structure backfill	cy	15,700	3.50	2.75
Haul	cy	48,000	0.25	0.16
Imported subbase mat.	miy	45,500	2.00	1.35
Mix, spread & compact CTS	sy	3,100	0.35	0.20
CTB	sy	55,000	0.30	0.22
Portland cement, S & B	bbl	5,520	5.00	4.00
Mineral aggr. C T B	ton	24,500	2.50	2.50
Asphaltic emulsion, AE	ton	109	37.00	30.00
Liquid asphalt, MC-2, curing seal	ton	3	50.00	35.00
Paving asph, P M S	ton	660	7.00	6.00
Mineral aggr, P M S	ton	13,190	7.00	6.00

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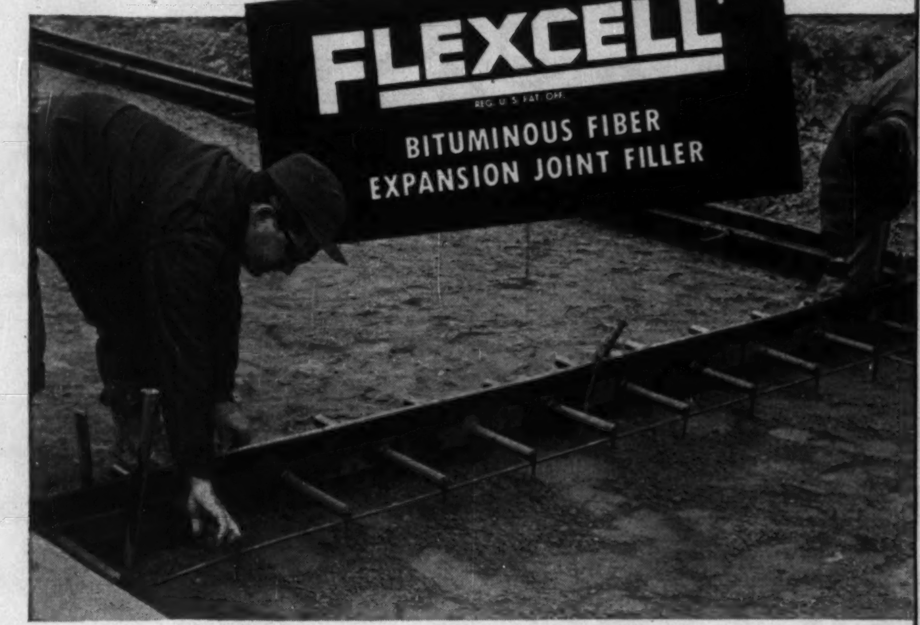

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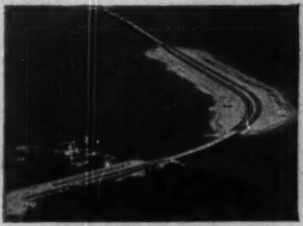

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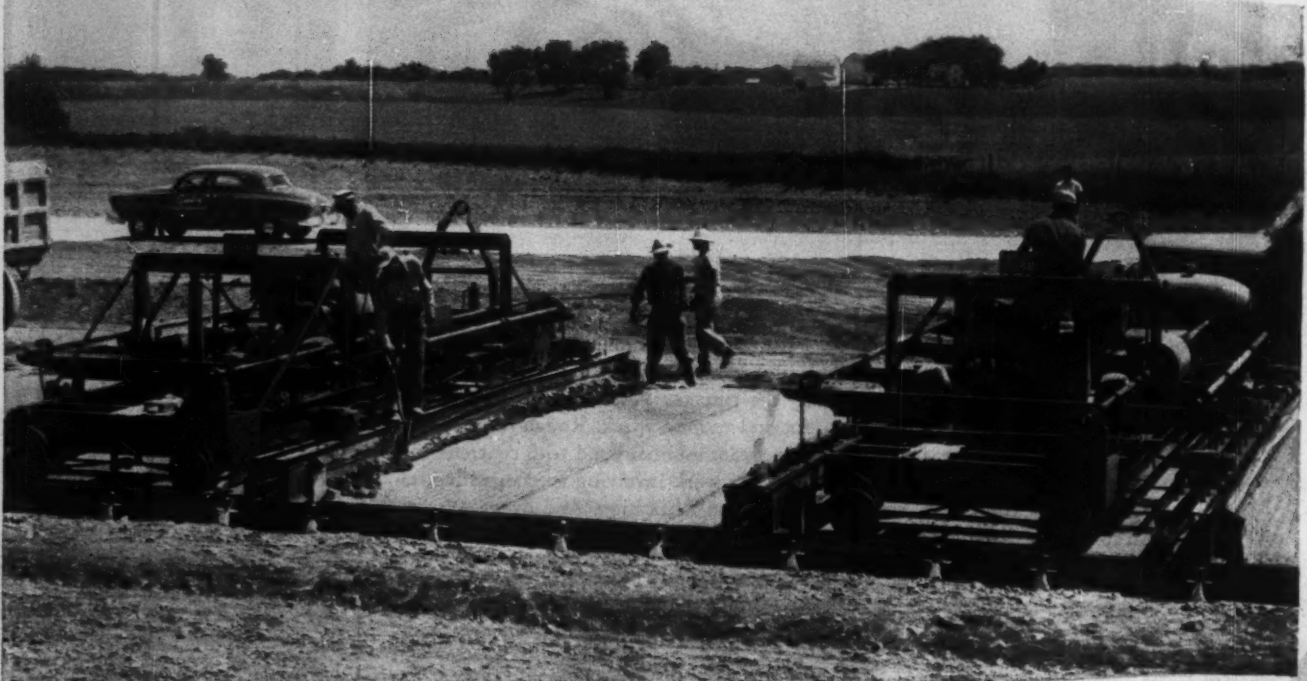

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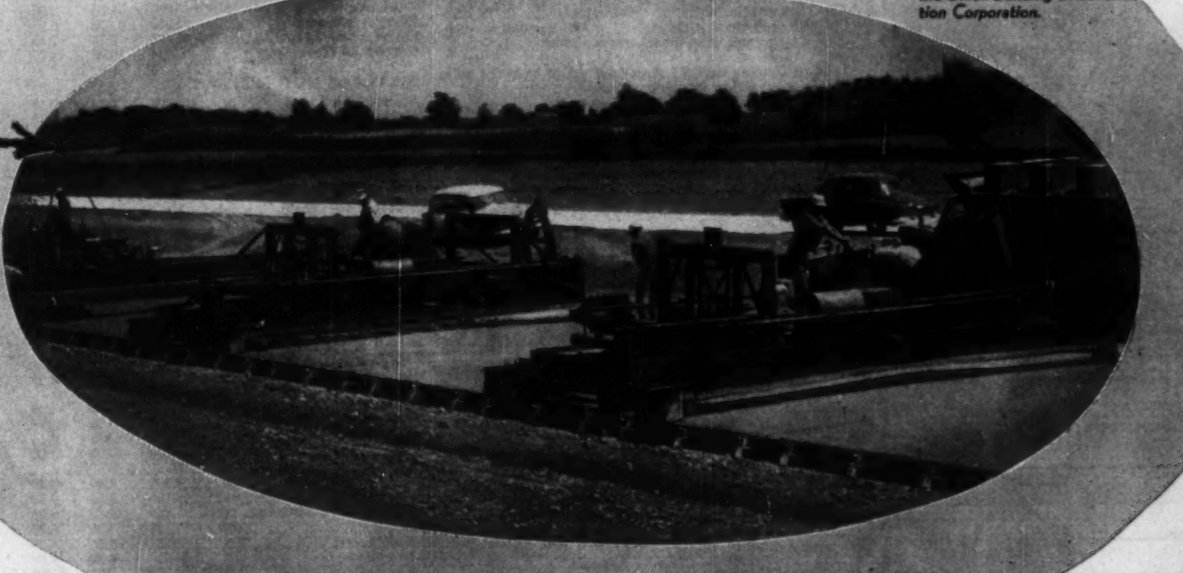
HOOSIER TURNPIKE CONTRACTORS FOLLOWING LEAD OF OHIO PIKE CONTRACTORS...

SPECIFY: *Flex-Plane* FINISHING MACHINES

Almost before your eyes the nation's leading turnpike system is threading its way from New York to Chicago. The first section of the Ohio Turnpike is already open, and the Indiana Turnpike is beginning to take shape. From the Tappan Zee Bridge that crosses the Hudson River in New York State to the fresh concrete now being laid on the Hoosier plain—one piece of equipment is predominate—**the Flex-Plane Finishing Machine.** The reasons: It's the fastest, most flexible machine of its kind marketed today. Its versatility is unlimited—it will work straightaways, variable widths and super elevated curves with equal efficiency; it has all the speed and power needed to keep pace with any paving schedule; its screeds are mounted outside the frame where they should be for best finishing results, ease of crowning and maintenance; it's completely portable, eliminating crane lifting or jacking; its width selection is most advantageous to today's paving requirements.

There's even more—little wonder that it has become America's most popular finisher. See it in action; talk with owners and we're sure you, too, will make your next machine a Flex-Plane Finisher.

This pair of Flex-Plane Finishers are working north of Angola, for the Union Building & Construction Corporation.



WORLD'S LARGEST BUILDER OF CONCRETE FINISHING EQUIPMENT

PERMACRETE

Pre-Cast Crossing Slabs

change "cross" crossings

to smooth, low-cost permanent crossings

Stop unnecessary damage to industrial cars, trucks and cargo with smooth, durable Permacrete pre-cast concrete Crossing Slabs. Time, weather and high-impact traffic play havoc with ordinary railroad crossing materials but Permacrete slabs provide the maximum in strength and safety, coupled with low initial cost and no down time for repairs. Don't settle for less . . . Get Positive Performance with Permacrete.

Get these money-saving facts

Write for new Permacrete bulletin for complete story on economical, easy-to-install concrete crossing slabs.

PRE-CAST PERMACRETE
CONCRETE CROSSING SLABS

PERMACRETE PRODUCTS CORPORATION
1839 South Wall Street
Columbus 7, Ohio

Please send me free fact bulletin on low-cost Permacrete Crossing Slabs

Name____________________
Position____________________
Company____________________
Address____________________
City__________ State__________

California Freeway

Continued from preceding page

Bids: 7-13-55 Items	Unit	Quantity	Unit Prices 1C	2
Screenings, seal coat	ton	526	7.00	5.50
Sterilizing soil	sy	41,100	0.30	0.06
Light weight, P M S	cy	250	40.00	20.00
Cl B conc pavement	cy	685	25.00	20.00
Pave tie assemblies	ea	615	0.60	0.60
Cl B conc, park strips	cy	1,880	20.00	19.25
Cl A conc, bridge, 54,000 cy	ls	job	2,565,000	2,613,000
Prestressed conc caps, 2,020 cy	ls	job	101,000	78,000
Rubber waterstops	lf	2,900	2.00	1.85
Bar reinf. st, bridge, 8,500 ton	ls	job	1,445,000	1,500,000
Bar reinforcing steel	lb	9,800	0.09	0.13
Timber piling, furn	lf	6,300	0.70	0.80
drive	ea	143	35.00	28.00
Conc piling, furn	lf	129,000	3.00	3.30
drive	ea	3,843	32.00	33.00
Steel piling, furn	lf	5,750	3.50	3.75
drive	ea	94	65.00	65.00
Splices	ea	10	30.00	27.50
Cl B conc, curbs, gutters & sidewalks	cy	1,900	33.00	43.00
Chain link fence,				
Type I, 72"	lf	10,020	1.50	1.50
Type II, 72"	lf	2,470	1.70	1.60
Walk gates	ea	2	60.00	60.00
Gates, 6'	ea	40	50.00	55.00
R C P SS, 12"	lf	1,756	3.50	2.40
15"	lf	260	4.00	3.00
18"	lf	560	5.00	3.50
21"	lf	128	6.00	4.50
24"	lf	288	7.00	5.00
27"	lf	644	8.00	6.00
33"	lf	580	10.00	7.00
36"	lf	584	11.00	8.50
36", 3,000-D.	lf	24	15.00	10.00
Finishing roadway	ls	job	2,500	6,000
Prestress, steel & prestress oper	ls	job	95,000	80,000
Misc iron & steel	lb	145,000	0.33	0.25
Safety railing	lf	25,750	4.00	3.80
Type F railing, rem & reset	lf	460	2.50	3.00
Remov	lf	980	1.20	1.00
Sign frames	ls	job	10,000	11,000
Detour bridge	ls	job	65,000	75,000
Inlets, Type A3	ea	8	250.00	220.00
Type B3	ea	4	225.00	160.00
Type D	ea	40	270.00	220.00
Type S	ea	18	120.00	100.00
Inlet boxes	lf	130	40.00	35.00
New manholes	lf	122	25.00	35.00
Frame & cov	ea	6	60.00	80.00
Metal plate guard rail	lf	180	3.00	4.00
Asbestos-cement pipe, 4"	lf	836	3.25	2.60
12"	lf	6,100	3.70	3.75
Clay sewer pipe, 6"	lf	28	1.50	1.75
10"	lf	168	3.50	3.30
12"	lf	2,100	4.00	3.60
24"	lf	268	10.00	9.50
Adj MH & CB to grade	ea	20	45.00	33.00
Install, salv MH frs & cov	ea	10	30.00	20.00
Pipe seals	ea	5	25.00	15.00
Port timber barricades	ea	64	35.00	30.00
Removing improvements	lf	job	8,000	6,000
Electrical installation	lf	job	105,000	140,000

•CT cement treated •S subgrade •B base
•PMS plant mixed surfacing •SS standard strength
•AE curing seal, paint binder and seal coats.

Time allowed: start, 15 days from notice of award with completion within 450 working days.

Roadways and Structures for Massachusetts Turnpike

A 5.5-mile section of the Massachusetts Turnpike between Millbury and Auburn drew 11 bidders. The $8.7 million low was six percent under the engineers' estimate, 12 percent under the high and less than two percent below the second low bid. Contract to C. J. Langenfelder & Son, Inc., Baltimore, was awarded by the Massachusetts Turnpike Authority, Philip H. Kitfield, chief engineer.

Work includes construction of two roadways divided by a median, a major interchange, service roadways, altered and relocated roadways, 12 steel stringer bridges, 1 single span, 3 3-span, 7 4-span, 1 5-span, and 5 concrete box culverts, 1 1-cell, 3 2-cell and 1 4-cell.

By consigning all shipments to the Authority the contractor is exempt from the 3% transportation tax. Work will proceed simultaneously by other contractors on adjoining sections of the Turnpike. Owning utilities, corporations and municipalities will remove, furnish and install all poles, wire and cable, gas, water, oil and other pipe lines except as noted in the schedule of unit prices.

All concrete is to be air-entrained by either Method A or C at Contractor's option.

Approved minimum hourly wages include: hoisting engineer $3.40, maintenance engineer $3.025, crane, power shovel, and trenching machine operators $3.40, tractor, bulldozer, and grader operators $3.025, common laborer $1.80, truck driver $1.945, Euclid operator $2.20, pipe layer $1.80.

Bidders include:

1C	C. J. Langenfelder & Son., Inc., Baltimore, Md.	$8,746,884
2	A. I. Savin, E. Hartford, Conn.	8,903,451
11	Central Engineering & Contracting Corp., Durham, N. C.	9,919,136
EE	Massachusetts Turnpike Authority	9,319,710

Completion: 10-31-56, liq damages $200/day

Bids: 6-21-55 Items	Unit	Quantity	Unit Prices 1C	2
Excavation:				
Clearing and grubbing	ac	205	$425.00	$700.00
Roadway earth excava	cy	1,790,000	0.81	0.90
Excava, roadway earth	cy	967,000	0.87	0.90
Cl A rock	cy	220,000	0.50	0.30
Peat	cy	35,000	3.00	4.00
Bridge	cy	14,000	1.75	3.00
Cl A trench	cy	50	6.00	3.00
Cl B trench	cy	7,400	0.75	1.00
Channel	cy	2,600	7.00	8.00
Cl B rock	cy	50,000	0.30	0.20
Borrow, ordinary	cy	217,000	1.05	0.60
Gravel	cy	5,100	3.00	3.00
Sand	lf	100	10.00	20.00
Undisturbed dry samples	ea	5	20.00	50.00
Roadway base & surface:				
Cr stone for Mac base	t	75,700	3.05	4.00
Bitumen for Mac base	gal	440,000	0.11	0.12
Calcium chloride for road-dust control	lb	140,000	0.04	0.03
Bitumen for surf treat	gal	20,000	0.175	0.16
Cl I bit conc pvmt type I-1	t	47,500	6.75	7.25
Gran rubble block pvmt	cy	250	16.00	14.00
Structures:				
Steel sheet left in pl	lb	497,000	0.14	0.12
Untreated timber piles	lf	8,300	1.50	1.70
Pile loading test	ea	1	2,000.00	500.00
Cl A cmt conc msry in footings	cy	8,180	28.50	22.75
Cement conc masonry				
Cl A in stems	cy	5,740	$46.00	$48.25
Cl A in piers shafts	cy	4,470	54.00	50.00
Cl A in appr slabs	cy	2,430	26.00	20.25
Cl A in all box culv ex Bl Riv culv	cy	4,740	47.00	45.00
Cl A in fndn slab for Bl Riv culv	cy	3,100	25.00	25.00
Cl C for subslab at Dark Brook Res culv	cy	800	28.00	25.00
Cl D bridge decks	cy	6,950	62.00	54.00
Cl D in pipe structs	cy	380	70.00	80.00
Cl D in median strip at interchange	cy	580	25.00	25.00
Cl F in walls & roof slab Bl Riv culv	cy	4,350	46.00	43.60
Steel, reinf for struct	lb	5,371,000	0.105	0.128
Steel, structural	lb	10,241,000	0.1565	0.15
CIP and fittings	lb	9,340	40.00	40.00
Cl & cast steel inlet frames and covers	lb	8,800	0.40	0.40
WIP and fittings	lb	8,100	0.50	0.30
Bituminous dampproofing	cy	7,260	0.80	0.85
Riprap	cy	3,120	7.00	6.00
Slope pav for bridges	cy	13,030	5.00	6.00
Steel rail on conc	lf	9,620	8.50	7.00
Alum railing on conc*	lf	9,620	5.50*	6.00*
Steel piles 10BP57	lf	13,866	5.50	5.00
Steel file splices	ea	92	50.00	40.00

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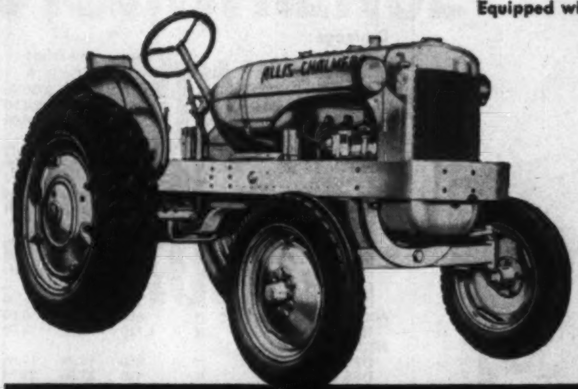
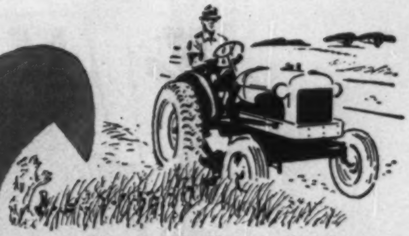
18 Drawbar hp.
Speeds to 8.5 mph
Equipped with lights and starter



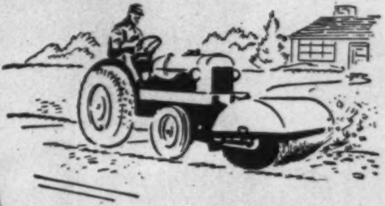
NOW YOU CAN

Cut Costs All Year 'Round on All These Jobs

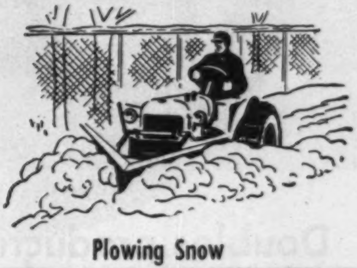
WITH ALLIS-CHALMERS **IB** POWER



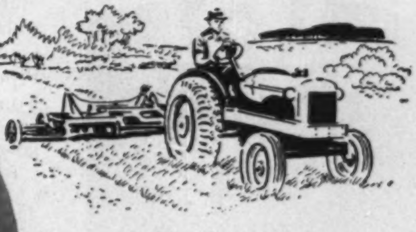
Mowing Weeds and Rough



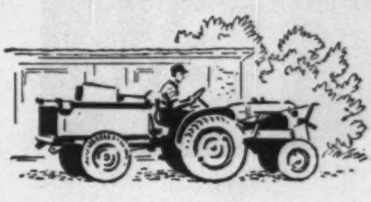
Sweeping Leaves, Cleaning Walks



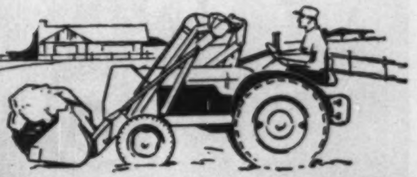
Plowing Snow



Pulling Gang Mowers



Hauling Material



Loading, Stockpiling

The hard-working Allis-Chalmers IB Tractor knows no season. With broom, snowplow, crane and sickle bar, it makes an ideal tool.

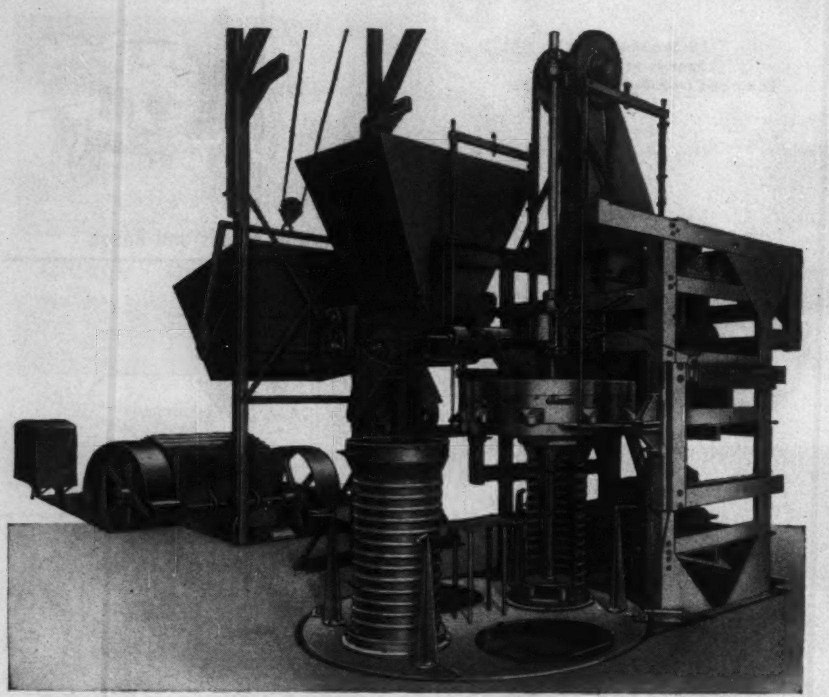
Compact design, short turning radius and low center of gravity enable operator to work quickly, but safely, in close quarters and on steep slopes. Quick-hitch drawbar lets him hook onto and release loads from the seat . . . makes his job easier and safer.

See your nearby Allis-Chalmers dealer and ask him for a demonstration. He'll be glad to *show* you how the IB can help you cut costs *all year 'round.*

CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

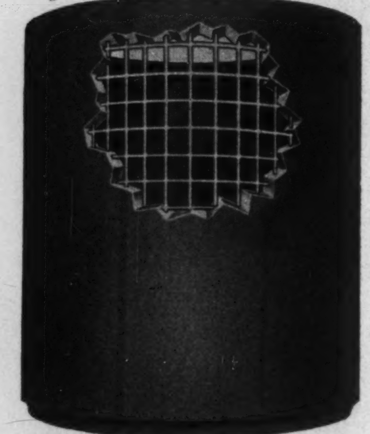
ALLIS-CHALMERS

A-C
ALLIS-CHALMERS



McCracken "T" Concrete Pipe Machine

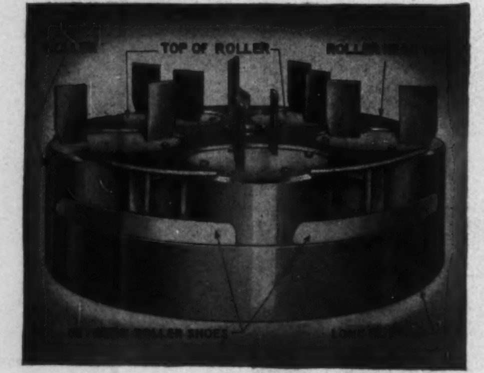
Doubles production of 6" to 36" Pipe



36" Pipe with eliptical steel cage—saves ½ the steel.

Here's the one Machine on the market today that can handle *all* your production from 6" to 24" Bell and Spigot Sewer Pipe (plain) and from 12" to 36" Tongue and Groove Culvert Pipe (reinforced). In footage this range of sizes is 80% of the market.

These are the *small sizes* in which *machine-made* production and its resulting economies are essential to compete. This Model "T" Machine offers important savings ranging from 50% on the smaller down to 10% on the larger sizes. It doubles production—needs no Pallets and saves extra handling of B&S Pipe—permits handling double the business with half the inventory.



ONE 8-HOUR SHIFT PRODUCES:

PLAIN PIPE	SIZE OF PIPE	REINFORCED PIPE
2400 feet	4" to 12"	- - -
1750 feet	12" to 18"	1600 feet
1200 feet	21" to 24"	1100 feet
- - - -	30" to 36"	900 feet

Exclusive Roller-Head, used in sizes 12" to 36", packs the 4" wall of 36" pipe like a Packer-Head packs the 1" wall of 10" pipe.

WRITE FOR DETAILS

CONCRETE PIPE MACHINERY CO.

10 GEORGE STREET • SIOUX CITY 17, IOWA

Massachusetts Turnpike

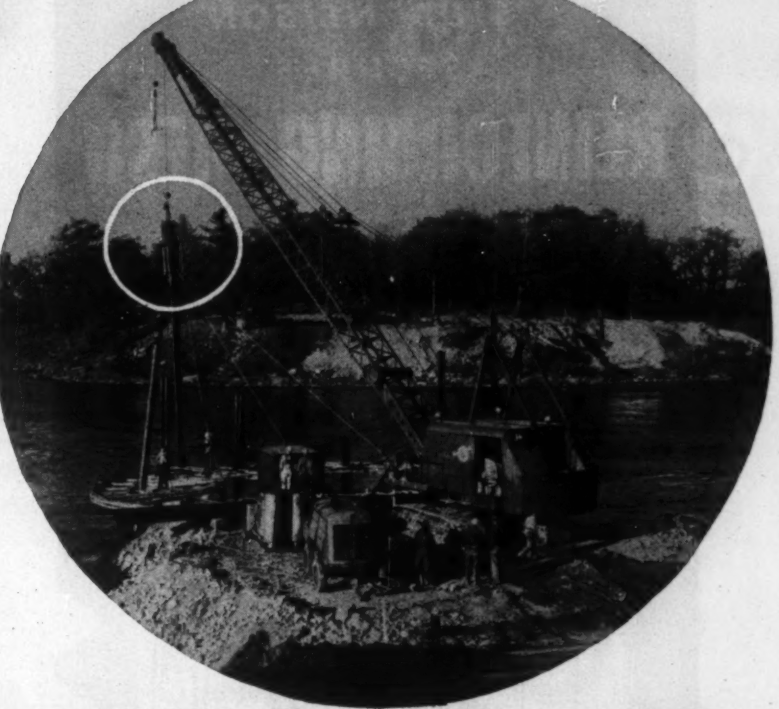
Continued from preceding page

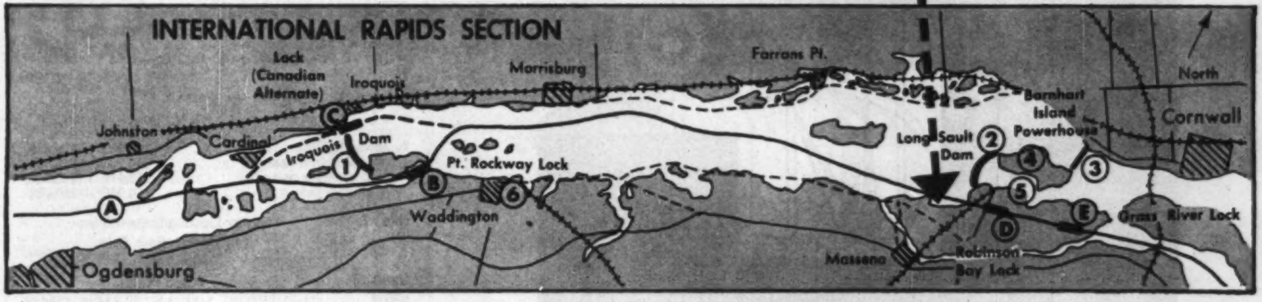
Items	Unit	Quantity	Unit Prices 1C	Unit Prices 2
Drainage:				
Drop inlets, type D-2	ea	4	$275.00	$250.00
Drop inlets, type D-3	ea	298	275.00	250.00
Manholes	ea	1	300.00	250.00
CB & MH, change in type incl new MH fr & cov.	ea	1	200.00	200.00
RCC Pipe SS 15"	lf	9,100	4.50	4.20
SS 18"	lf	950	5.10	5.00
SS 30"	lf	60	11.50	9.00
SS 36"	lf	700	13.00	11.00
SS 42"	lf	270	15.00	14.50
SS 54"	lf	270	23.00	22.50
ES 24"	lf	150	9.75	8.00
ES 36"	lf	610	14.50	12·00
ES 42"	lf	130	17.50	14.50
ES 48"	lf	130	20.00	18.00
ACCM Pipe 16 gauge, 15"	lf	960	5.90	6.25
16 gauge, 18"	lf	1,110	6.60	8.00
RCC Pipe				
DES 36" 5,000D	lf	660	18.00	17.00
DES 42" 5,000D	lf	480	22.50	22.00
CIP undrdr with 8" cradle invert	lf	5,000	5.00	4.50
P culv rem and stacked	ls	1	2600.00	1500.00
Grt cobble stone pav, waterways	sy	900	6.50	7.00
Bit mix pav, waterways	sy	5,920	3.00	3.00
Guards and fencing:				
Indiv conc posts, square	ea	10	9.00	8.00
Highway guard, C3S	lf	32,000	1.90	1.70
Anchors, end, C3S	ea	77	50.00	45.00
C3C	ea	4	50.00	45.00
C2C	ea	4	33.00	45.00
Anchors, intermed, C3S	ea	82	51.00	45.00
Anchor assemb, bridge	ea	48	27.00	20.00
Hwy grd, steel beam, single face	lf	20,000	2.75	2.70
rem & reset	lf	1,300	1.00	0.90
anchors rem & reset	ea	10	15.00	15.00
posts rem & reset	ea	10	3.50	4.50
Fence, stock	lf	48,500	0.60	0.50
gates, stock	ea	10	35.00	35.00
chain link, 48"	lf	17,000	1.90	2.15
barrier	lf	300	9.80	8.00
Curbs:				
Gran curb				
VA4, str 6"x18"	lf	3,100	$3.25	$5.10
curv, 6"x18"	lf	500	4.75	7.00
VA5, str 6"x9½"	lf	15,950	4.00	5.00
curve, 6"x9½"	lf	100	6.00	8.00
corners	ea	10	25.00	35.00
Gran edg type SB, 6"x12"	lf	22,600	2.00	2.00
Gran faced precast curb, 6"x18"	lf	72	3.50	7.00
transition	lf	72	4.00	10.00
Curb removed and reset	lf	550	2.00	2.00
inlets rem & reset	ea	2	20.00	50.00
corners rem & reset	ea	2	15.00	50.00
Structures at crossings:				
Conc sidewalks, 1-crse	sy	300	4.50	6.00
Bounds furn & set	ea	130	20.00	20.00
Bounds rem and reset	ea	5	18.00	15.00
Elec ducts and MH at				
Bridge K4	ls	1	3,000.00	6,000.00
Bridge K5	ls	1	4,500.00	8,200.00
Bridge K6	ls	1	3,200.00	7,000.00
Bridge K9	ls	1	5,550.00	11,000.00
Bridge K11	ls	1	2,800.00	6,000.00
Bridge K12	ls	1	2,500.00	5,000.00
Bridge K15	ls	1	8,500.00	7,000.00
Tele and Fire alarm ducts and MH at Bridge K2.	ls	1	9,500.00	8,500.00
Bridge K4	ls	1	2,500.00	7,000.00
Bridge K5	ls	1	3,300.00	22,000.00
Bridge K6	ls	1	4,400.00	10,000.00
Bridge K9	ls	1	6,600.00	15,800.00
Bridge K10	ls	1	3,800.00	7,000.00
Bridge K11	ls	1	3,000.00	8,000.00
Portable office bldg	ea	1	3,000.00	4,000.00
Portable building with sanitary facilities	ea	1	4,000.00	4,000.00
Seeding and sodding:				
Loam borrow	cy	20,000	$1.30	$2.00
Loam rehandled & spread	cy	16,000	1.10	1.20
Peat rehandled & spread	cy	25,000	1.20	1.20
Seeding	sy	470,000	0.07	0.07
Field sodding	sy	6,300	1.10	1.20
Water lines:				
CI water main B&S, cmt lined				
CI 150, 8"	lf	1,000	6.00	6.00
CI 150, 6"	lf	970	7.00	5.00
CI 250, 8"	lf	2,050	6.80	6.50
CI 250, 6"	lf	290	6.50	5.50
Hydrants furn & instal	ea	1	500.00	250.00
Hydrants rem & reset	ea	2	225.00	200.00
Copper tube, type K, ¾"	lf	330	3.30	2.00
Temporary service, 4"	lf	1,000	4.25	2.00
Gate & gate boxes, 8"	ea	6	275.00	200.00
6"	ea	5	250.00	150.00
Curb cock and box	ea	17	50.00	25.00
Corporation cock	ea	17	30.00	20.00
Water pipe insul, 8"	lf	200	8.00	3.00
6"	lf	350	6.50	3.00
Steel casing, 18"	lf	330	12.00	10.00

Continued on following page

ST. LAWRENCE POWER PROJECT

started with blows by a McKIERNAN-TERRY Pile Hammer




INTERNATIONAL RAPIDS SECTION
Lock (Canadian Alternate)
Iroquois Locks
Morrisburg
Farrans Pt.
Barnhart Island Powerhouse
North
Cornwall
Johnston
Cardinal
Iroquois
Dam
Pt. Rockway Lock
Long Sault Dam
Waddington
Grass River Lock
Massena
Robinson Bay Lock
Ogdensburg
A
B
C
D
E
1
2
3
4
5
6

By 1959, the St. Lawrence River, between Ogdensburg and Massena, N. Y., will be delivering more than 12½ billion kilowatt-hours of electric energy per year by means of hydroelectric plants served by 3 dams.

The first major contract for this huge undertaking was started by Dravo Corporation at the foot of Long Sault Island near Massena late in 1954. As the first step in diverting the south channel of the river to permit building one of the dams, a McKiernan-Terry 9B3 Double-Acting Hammer was used to set the initial piling for a cofferdam.

Here, as in many thousands of large and small projects all over the world—wherever stabilization is required for foundations—the contractor selected McKiernan-Terry Pile Hammers to speed the work and help assure a creditable, profitable job.

McKIERNAN-TERRY CORPORATION

80 Richards Avenue, Dover, New Jersey

Manufacturing Engineers • Plants: Harrison, N. J., Dover, N. J.

McKIERNAN TERRY

Also Manufacturers of Coal and Ore Unloaders and Bridges, Grab Buckets, and Special Machinery

MK-364

"STUD" NELSON SECURES

REINFORCING MESH

IN A FLASH!

In one effortless instant the NELWELD® gun securely fuses a rectangular stud to a steel member. Wire is then placed in the T slot of the stud where a few quick blows with a hammer permanently clamp the mesh in place. Securing wire mesh for guniting, fireproofing columns, special linings, etc. is a simple matter with the NELWELD® System.

RECTANGULAR STUD BEFORE AND AFTER WIRE IS SECURED

In addition, NELSON rectangular studs are successfully used to secure steel reinforcing, expanded metal lath and similar materials.

Consult your Nelson Field Engineer. He'll be glad to weld rectangular studs on the job to demonstrate this fast economical means of fastening. He can also discuss NELWELD® short cuts as they apply to your specific construction problems. Write for details.

Stud Nelson

Fasten it Better at Less Cost with

NELWELD

NELSON STUD WELDING
2744 Toledo Avenue
Lorain, Ohio

Please send more information on cost saving NELWELD construction applications.

NAME____________________

COMPANY____________________

ADDRESS____________________

CITY AND STATE____________________

NELSON STUD WELDING DIV OF GREGORY INDUSTRIES INC LORAIN, OHIO

Massachusetts Turnpike

Continued from preceding page

Structures at crossings:

Items	Unit	Quantity	Unit Prices 1C	2
Plate load tests, unconf.	ea	2	1,000.00	1,000.00
Steel piles, 10BP 42	lf	2,234	5.00	5.00
Tele and fire alarm ducts and MH at				
Bridge K12	ls	1	4,000.00	7,000.00
Bridge K14	ls	1	3,100.00	10,000.00
Tele ducts & MH, at				
Bridge K15	ls	1	5,200.00	8,000.00
under turnpike	ls	1	2,400.00	6,000.00
under turnpike	ls	1	3,500.00	8,000.00
Tele ducts, Leicester St.	ls	1	7,200.00	12,300.00

* Alternate accepted on price basis.

Concrete classes: minimum compressive strength in lbs per sq in at 28 days. *A 3,000 *B 2,500 *C 2,000 *D 3,000 *E 3,000 *F 3,500

Roadway Lighting for Kentucky Turnpike

Alternate bidding on aluminum, concrete and steel poles enlivened May 17 letting for lighting materials and equipment for the Kentucky Turnpike now under construction from Louisville to Elizabethtown. D. H. Bray is state highway engineer handling the work and Howard, Needles, Tammen & Bergendorff, Kansas City, Mo., are the consultants.

Bidders included:

1C	Marine Electric Co., Inc., Louisville, Ky	$215,208†
2	Thompson-King-Tate, Inc., William Hepburn & Co., Lexington, Ky	213,765♯
4	Joe H. Hayes Electric Co., Inc., Louisville	303,034*

Alternate bidding on poles

	1C	2
Roadway lighting	$103,933	$123,838
With aluminum poles	215,208†	216,145
With concrete poles♯	206,910	213,765♯
With steel poles*	204,046*	215,282

Bids: 5-17-55 Roadway Lighting Units—Poles

Unit Prices—Each Pole

Items	No	†Aluminum 1C	2	♯Concrete 1	2	*Steel 1	2
LBLP	81	$483	$399.46	$451	$382.72	$429	$396.05
LBMP	12	457	378.13	440	377.11	415	381.07
LBSP	6	438	352.44	434	374.74	405	361.48
SBLP	93	475	391.20	441	376.26	425	389.25
SBMP	9	450	369.85	426	370.28	411	374.25
SBSP	5	431	357.40	419	346.12	401	363.19
Duplex	10	697	574.87	661	521.44	618	566.42
OHsgn	5	1,338	1,210.47	1,002	1,376.67	1,309	1,114.70

*L long *M medium *S short *B bracket
*P pole *OHsgn overhead sign support

Roadway lights, cable & conduit

Items	Unit	Quantity	Unit Prices 1C	2
Parking lot light	ea	1	$220.00	$160.18
Power connections	ea	4	735.00	385.42
Sign spot lights	ea	5	24.00	38.45
Fluoresc type lghtg units	ea	8	286.00	257.62
Lighting cable, multiple circuit, insulated & neutral,				
#2 AWG	lf	3,450	1.95	2.33
#4 AWG	lf	16,850	1.80	2.19
#6 AWG	lf	15,750	1.68	2.08
#8 AWG	lf	12,800	1.60	2.01
#12 AWG	lf	650	0.13	0.36
Concrete-encased duct	lf	1,863	4.50	5.58
Rigid conduit: 3" ϕ galv	lf	1,075	3.30	3.40
3/4" ϕ galv	lf	480	0.90	0.63
Junction boxes	ea	8	38.00	48.95
Marker lights	ea	10	80.00	70.07
Glare shields	ea	32	20.50	15.56
Cable, pre-assembled	lf	160	1.00	1.36

Toll Recording Equipment

Toll collecting equipment for the 40-mile Kentucky Turnpike will cost $66,180. This includes furnishing and installing complete equipment for registering, recording and signalling toll collections and for automatically counting traffic axles moving through the toll plazas.

Bidders include:

1	IBM (lump sum only, therefore disqualified)	$60,000
2C	Taller & Cooper, Inc., Brooklyn 1, N. Y.	66,180

Bids: 5-27-55 Items	Unit	Quantity	2C Unit Price
Mechanical toll registers	ea	14	$1,865
Remote printing recorders	ea	4	3,000
Toll paid indicators	ea	12	350
Overhead classification indicators	ea	12	300
Axle counting treadles	ea	18	225
Treadle frames	ea	16	175
Static eliminators	ea	12	15
Power supply	ea	2	500
Toll booth counter	ea	12	720
Drawer bank	ea	2	1,700
Master clock	ea	2	100

Lump sum bid did not comply with specifications

Road Signs for Kentucky

The variety and cost of signs for guiding the customers of Kentucky's new Turnpike between Louisville and Elizabethtown are shown below. Work is for the Kentucky Department of Highways, D. H. Bray, state highway engineer. Howard, Needles, Tammen & Bergendorff, Kansas City, Mo. are the consulting engineers.

The bidders were:

1C	Minn. Mining & Mfg. Co., St. Paul, Minn.	$73,700
2	Elastic Stop Nut Corp. of America, AGA Div., Elizabeth, N. J	81,870
3	Federal Sign & Signal Corp., Chicago, Ill	89,622

Bids: 7-7-55 Items	Unit	Quantity	Unit Prices 1C	2
Fabrication of sign by type				
A 0.125-in sheet aluminum	sf	2,700	$2.98	$4.00
A 0.162-in sheet aluminum	sf	800	3.77	4.50
A structural panel	sf	3,600	4.63	5.50
B structural panel	sf	2,300	5.31	4.40
C 0.125-in sheet aluminum	sf	170	2.12	3.00
C structural panel	sf	100	3.22	4.25
Aluminum letter, cutouts, 6"	ea	150	0.793	1.00
Timber posts, 4"x6", f & e	lf	5,100	2.11	3.35
4"x6", f	lf	1,050	0.45	0.60
6"x6", f & e	lf	1,400	2.72	3.61
6"x8", f & e	lf	1,350	3.10	4.00
Steel post U, f & e	lf	620	1.28	0.70
f	lf	580	0.40	0.30
8WF13, f & e	lf	760	4.64	4.30
Overhead sign, f & e	ea	1	600.14	340.00
Sheet aluminum signs, e	sf	2,700	1.31	0.40
Struct panel signs e	sf	6,000	0.84	0.50

1	Minn. Mining & Mfg. Co., St. Paul, Minn		$39,919 S
		C	41,203 A
2	Federal Sign & Signal Corp., Chicago, Ill		56,296 S
			58,552 A

• A based on aluminum structural panel. • S Based on steel structural panel.

Bids: 7-7-55 Items	Unit	Quantity	Unit Prices 1C	2
Fabrication of signs by type				
A 0.125-in sheet aluminum	sf	2,700	$2.98	$4.65
A 0.162-in sheet aluminum	sf	800	3.77	5.45
C 0.125-in sheet aluminum	sf	170	2.12	4.15
Aluminum letter cutouts, 6"	ea	150	0.793	2.10
Overhead sign, f	ea	1	458.97	415.00
Fabrication of signs by type				
A aluminum struct panel	sf	3,600	4.63	5.61
B aluminum struct panel	sf	2,300	5.31	8.50
C aluminum struct panel	sf	100	3.22	4.55
A steel struct panel	sf	3,600	4.50	5.15
B steel struct panel	sf	2,300	4.96	8.25
C steel struct panel	sf	100	3.11	4.30

1	Minn. Mining & Mfg. Co., St. Paul, Minn		$47,186s
			36,086a
2	Federal Sign & Signal Corp., Chicago, Ill		31,490s
		C	31,070a
3	United Advertising Corp., Newark, N. J		63,353s
			58,853a

• a using aluminum structural panel signs erected
• s using steel structural panel signs erected

Continued on following page

"STUD" NELSON SECURES

WOOD NAILERS IN A FLASH!

Looking for a faster, less costly way to fasten wood nailers to steel?

You'll find the answer in NELWELD®—the trigger-quick method of end welding fastener studs to steel. It makes the securing of wood nailers as simple as A-B-C . . . (A) Weld Nelson thread studs to steel member, (B) Lay nailer over studs and strike with hammer, giving stud locations, (C) Drill wood and assemble. An alternative method is to pre-drill wood and weld studs through holes in nailers.

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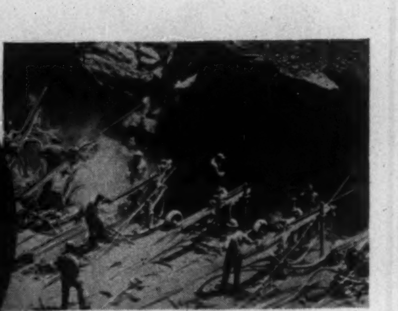

AND KEEP THE JOB *MOVING!*

*Goodall hose, belting, footwear and clothing have been used as standard equipment by contractors for many years. Such continued confidence in Goodall products can only be credited to reliable performance and economy in service. Many items in the "Cloverleaf" Line were originally developed specifically for the Contractor, and still lead the field in helping to keep the job moving under severest working conditions. Make Goodall your *buy*-word . . . and profit by the quality, reliability and economy which the name assures.

HOSE—

Keep the job moving by using hose that is built to *stand up longer* under conditions that would soon send ordinary hose to the scrap pile. For Steam-"Inferno", "76" and "Long Life". For Air-"Subway", "Brown Cord", and "Mine King", with "Allgood Cord" for manifolds and caissons. For Water-"Roadbuilders", "Buckskin" and "Bellwood"; "Allgood Jet" and "Newtype" Suction. And for Grout, Concrete Placing and Cement Placing Hose, your *best buy* is "Goodall."

BELTING—

Keep the job moving with belting that's built to safely handle the longest, heaviest hauls . . . that assures steady performance, free from shutdowns for repairs. "Super Triple-S" Conveyor Belting has an unequalled reputation for strength and stamina on some of Construction's toughest assignments, with "Triple-S" and "La Crosse" running close seconds. "Wear King" Mucker Belts have broken all records for tonnage handled before replacement. For Elevator Belting, its "Super Triple-S", and for Grader Belts, "76".

CLOTHING and FOOTWEAR—

Keep the job moving by having your men equipped for the wet-work and wet-weather jobs with clothing and footwear that provide fullest protection with maximum comfort. The Goodall Line includes coats, jackets, overalls and suits—Rubber, Latex and Oiled—that never fail to demonstrate their *extra* measure of quality. Among the boots, "Toe-Saver" and "Wear King" are outstanding leaders in quality, comfort, protection and long-wear economy.

The "TOE-SAVER" (R) BOOT

Smooth, flexible black rubber, duck lined. Comfortable cushion insole. Tire-Tread outer sole. White cap over reinforced steel safety toe that's tested to withstand 2,000 lbs. pressure.

Short, Storm King and Full Hip lengths, with permanent size markings.

— • —

Other Goodall protection-with-comfort items include work shoes, pacs and rubbers; "Hardboiled" Safety Hats and other headgear; and a variety of work gloves.

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GOODALL RUBBER COMPANY Date....................................

460 Whitehead Road, Trenton 4, N. J.

Please send literature and prices on the following:

☐ HOSE: .... (Type or Service) ☐ BELTING: .... (Type or Service)

☐ CLOTHING and FOOTWEAR—Complete Line. ☐ Send Salesman from your nearest Branch.

Company ....

Addresss ....

Attention of Mr.. Title..............................

GOODALL RUBBER COMPANY

GENERAL OFFICES, MILLS and EXPORT DIV., TRENTON 4, N. J.—Est. 1870.

Branches and Distributors in Principal U. S. Cities and in Canada.

Road Signs for Kentucky

Continued from preceding page

Bids: 7-7-55 Items	Unit	Quantity	Unit Prices 1	2C
Timber posts, f & e, 4"x6"	lf	5,100	$2.34	$2.10
f 4"x6"	lf	1,050	0.50	0.42
f & e, 6"x6"	lf	1,400	3.02	2.30
f & e, 6"x8"	lf	1,350	3.46	2.50
Steel post U, f & e	lf	620	1.42	1.65
f	lf	580	0.44	0.75
8WF 13, f & e	lf	760	5.15	6.25
Erecting overhead sign	ea	1	156.86	90.00
Sheet aluminum signs e	sf	2,700	1.46	1.38
Struct panel signs e, steel	sf	6,000	2.78	0.62
aluminum	sf	6,000	0.93	0.55

Low Bids in New Mexico

Average unit prices on low bids from Jan 1-June 30, 1955 New Mexico State Highway Department.

Bids: 1st half 1955 Items	Unit	Quantity	Average Unit Price
Remov & rebuild fence	lf	142,402	$0.168
Excavation unclas	cy	1,659,027	0.444
for structs, rdwy	cy	2,716	1.77
bridge	cy	1,953	3.69
pipe culverts	cy	23,449	1.53
Borrow, selected	cy	563,032	0.17
Ordinary	cy	208,434	0.21
Watering	Mgal	180,145	0.65
Rolling, tamping roller	hr	15,808	5.83
pneumatic tired	hr	34,754	4.07
steel tired	hr	11,653	6.58
Equip operation roller	hr	297	13.41
50-ton roller	hr	750	12.00
Mechanical tamping	hr	13,508	5.12
Station yard overhaul	stayd	3,610,474	0.015
Quarter mile yard haul	¼mlyd	2,030,357	0.039
Ton mile haul	tmi	2,325,705	0.052
Obliterating old road	mi	8.1	211.42
Grading	mi	61.916	1,310
Blading & reshaping	mi	47.400	283.18
Contour ditches	lf	153,800	0.071
CMP underdrains perf galv 8"	lf	1,280	3.00
Mortar rubble masonry	cy	1,387	30.03
Excav for struct walls	cy	800	2.00
Grouted riprap cl A	cy	60.88	18.90
Wire enclosed riprap	cy	1,485	10.11
Wire fabric	lb	28,658	0.29
Excavation for riprap	cy	522	4.63
Steel stakes	lf	1,200	3.00
Cattle guards, 12′ rdwy	ea	3	1,333
18′ rdwy	ea	1	1,500
24′ rdwy	ea	51	1,713
Steel plate guard fence type A	lf	1,315	3.00
Galv barbed wire fence	lf	340,521	0.164
Bracing	ea	619	8.50
Gates Texas type	ea	89	17.92
Standard type	ea	43	40.47
ROW markers	ea	1,620	6.65
Std FAP markers type I	ea	35	60.14
type II	ea	9	70.56
Trtd timb warn posts, refl, 6" φ	ea	1,859	6.54
Selected borrow sub-base	t	162,175	0.45
Gradation sub-base controlled	t	404,773	0.67
Crushed quarry rock 3" max	t	66,950	1.00
Base course	t	595,832	0.80
Stockpile base course	t	4,000	1.31
Crushed quarry rock 1" max	t	20,800	2.00
Filler material	t	7,085	0.75
Bit matl, typ-SC-4 (for asph process base)	bbl	1,705	6.75
type MC-1	bbl	32,324	6.16
type MC-3	bbl	23,315	6.07
type SC-4 road mix	bbl	16,010	5.18
Mineral aggregate, rdmix	t	83,575	1.05
Mixg bit matl & aggr	mi	88,881	651.36
Bit matl, type RC-4	bbl	1,265	6.20
MC-5	bbl	12,675	5.65
200-250	bbl	1,170	6.24
120-150	bbl	15,795	5.84
Cover material	t	51,927	4.04
5/8"	t	4,685	4.90
1/2"	t	2,330	5.30
Stockpile 3/8" gradation	t	1,000	2.00
Bit matl typ 120-150, median	bbl	50	6.50
Cov matl, median	t	100	5.00
Bit matl typ 120-150, shoulder	bbl	585	6.50
Cov matl, shldr trtmnt	t	960	3.00
Plant mix surface course	t	115,222	3.55
Bit matl, typ 85-100, hot plant	bbl	7,144	6.22
85-100	bbl	37,057	4.96
85-100, tack coat	bbl	2,644	6.45
SC-5	bbl	1,127	6.92
SC-4, shldr trtmnt	bbl	325	6.72
SC-5	bbl	1,115	7.82
120-150	bbl	5	6.50
Mineral aggregate	t	5.015	2.82
Sand	t	130	3.00
Concrete, cl A	cy	4,793.91	51.43
Cl A bridge substruct	cy	860.30	62.37
Cl A bridge suprstruct	cy	1,083.30	62.94
Cl B	cy	333.33	46.67
Cl A for blanket ditch lining	sy	2,276.95	7.55
Conc, precst brdg units	cy	305.08	98.69
Light std bases, cl A	cy	49	75.00
Cut-off walls, cl B	cy	260	40.22
Reinf for conc structs	lb	842,730	0.135
Wire fabric for conc	lb	9,563	0.252

Continued on following page

THREE '56 BUCKEYES!

...Alive with big features from Wheel Hoist to Crawlers

Buckeye's new "O" series now includes 3 models, the 305, 307 and 308—each one with new, exclusive features for smooth, clean, low-cost ditching—each one built to outperform any machine in its class!

Live Hydraulic Wheel Hoist!

For faster, more accurate positioning of digging wheel independent of all other functions. Easily operated from the seat by simple, one-hand controls. Lets operator work faster, more profitably!

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Forward or reverse in 3 speeds to meet any conveyor need . . . Eliminates shock damage found when driven mechanically from digging wheel drive . . . Completely controllable from the seat.

Tractor Type Crawlers!

Allow variation in tread width and bearing areas thru a selection of pads specifically suited to any type digging . . . Idler rollers have face-type seals for long life . . . Strong, sturdy and reliable!

See the New "O" Series

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"VIBRAPIPE" means better pipe, less cost!

Concrete pipe cast "in the ditch"

New process produces five pipes per hour with one set of forms—costs reduced, quality is improved

An old concrete pipe manufacturing process has been gi new twist to

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FROM ARTICLE IN ENGINEERING NEWS-RECORD JUNE 10, 1954 PAGES 123-126

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48" x 8' ASTM C-76 VIBRAPIPE with baby bell made by LONGHORN in Edinburg, Texas.

HIGH PRODUCTION CAPACITY

of large size concrete pipe because of fast compacting with powerful VIBRAPIPE vibrators, which allow immediate removal of molding pipe forms.

LOW COST OF CONCRETE PIPE

Simple manufacturing set up; minimum equipment (one form of each size is enough to produce any number of pipes); lower cement ratio because of higher compaction and dry concrete; elimination of all maintenance and repairs.

GEORGE W. HOFFMANN CO.

Originator of the "VIBRAPIPE" Process

P. O. Box 452 SIOUX CITY, IOWA—USA.

Phone 80494

Low Bids In New Mexico

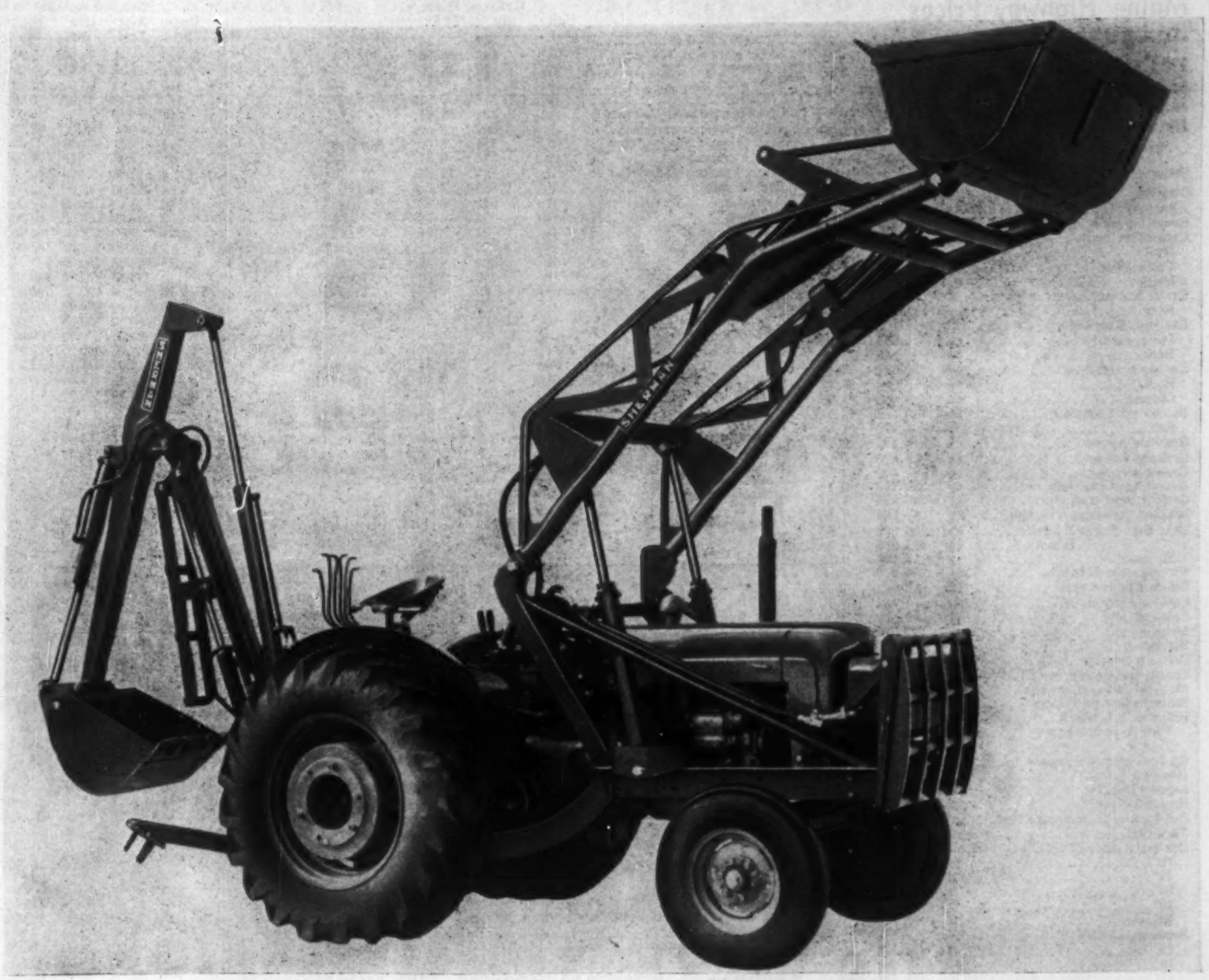
Continued from preceding page

Bids: 1st half 1955 Items	Unit	Quantity	Average Unit Price
Reinf for conc pave	lb	27,120	0.20
Concrete pavement	sy	8,142	4.00
Curb	lf	3,517	1.15
Curb & gutter	lf	43,468	1.78
Median curb & gutter,			
type I	lf	45,032	1.46
type II	lf	1,570	1.60
Valley gutter	lf	5,158	1.60
Sidewalks	sy	3,272	3.65
Driveways	sy	715	4.75
Sidewlks & drivewys, 6"	sy	162	6.00
Membrane waterproofing	sy	65	6.00
Waterproofing on walks	sy	20	1.00
Grouted rock retards	cy	703	16.88
Std RC pipe 18" φ	lf	676	5.36
24" φ	lf	6,354	5.88
30" φ	lf	8,204	7.52
36" φ	lf	10,938	8.67
42" φ	lf	252	11.05
48" φ	lf	6,458	12.90
54" φ	lf	214	16.19
60" φ	lf	648	30.00
66" φ	lf	192	20.25
84" φ	lf	120	30.00
Perf corr metal pipe, 8" φ	lf	48	3.60
Perf met culv pipe 8" φ, 16 ga, asph dipped	lf	40	3.00
CM culv pipe 8" φ	lf	172	3.00
12" φ	lf	90	3.00
18" φ	lf	432	4.43
24" φ	lf	9,686	5.35
30" φ	lf	4,918	6.47
36" φ	lf	3,826	9.42
42" φ	lf	1,096	11.44
48" φ	lf	1,554	12.81
54" φ	lf	372	18.33
60" φ	lf	506	19.11
72" φ	lf	174	23.30
72" φ, bev 1½:1	lf	88	32.00
84" φ, bev 1½:1	lf	158	36.49
84" φ, bev 2:1	lf	122	39.05
96" φ	lf	124	60.00
Galv MCulvP 24" φ	lf	328	5.00
30" φ	lf	206	6.25
36" φ	lf	168	10.00
42" φ	lf	94	13.25
48" φ	lf	74	15.00
60" φ	lf	132	23.50
Struct plate pipe, 120" φ bev 1½:1, ga 510-18	lf	140	65.66
126" φ	lf	60	75.50
126" φ bev 1½:1, ga 78-17	lf	122	67.00
132" φ bev 1½:1, ga 710-18	lf	220	74.29
162" φ bev 1½:1, ga 78-17	lf	109	88.00
180" φ bev 1½:1, ga 98-17	lf	504	100.00
Remov & re-lay culv pipe			
24" φ	lf	96	3.00
36" φ	lf	104	4.00
Structural steel	lb	473,685	0.176
Struct steel & railing	lb	3,171	0.40
Remov exist members	lb	9,879	0.20
Deck timbers, treated	Mbm	5,080	500.00
Creosote treated timber	Mbm	4,528	500.00
Treated timber piles ip	lf	57	8.00
Struct steel piles ip	lf	8,420	8.44
Digging pile holes	lf	476	5.00
Fiber conduit 2" φ	lf	20,780	0.92
Galv stand pipe 4" φ	lf	200	4.00
Galv conduit 2" φ	lf	1,450	1.90
Strand type RR insul			
#22 cable	lf	1,350	0.40
#6 cable	lf	19,700	0.25
Galv 90° ells 2" φ 9½ rad	ea	6	5.00
Strand type RR insul cable #4 600V	lf	24,244	0.40
Remov & rebld cattle grd	ea	2	500.00
French drains	lf	1,647	2.00
Remov concrete	cy	164	20.00
Damp proofing	sy	245	1.60
Asphalt plank	sy	65	10.00
Asphalt sand mastic	sy	65	2.00
Gravel backfill	cy	23	4.00
Wire rope ¾" φ	lf	60	2.00

Highway Unit Prices—Iowa

Average contract prices, Iowa State Highway Commission

Items		1941	1953	1954	1955
Road work					
Grading	cy	$0.097	$0.192	$0.149	$0.158
Conc pave, std	sy	1.952	4.197	4.044	3.928
type A	sy	1.435	2.908	3.532	3.237
Asphaltic concrete, Cl A	t	.....	7.919	7.131	7.027
Cl B	t	.....	.....	.....	4.387
Surfacing gravel	t	0.978	1.497	1.516	1.307
crush stone	t	1.543	2.889	2.794	2.675
Bridge and culvert work					
Concrete masonry	cy	17.850	47.909	41.235	43.891
Steel reinf	lb	0.041	0.121	0.102	0.107
struct	lb	0.064	0.171	0.161	0.155
Piling, untreated	lf	0.697	1.576	1.444	1.558
creosoted	lf	1.107	3.550	2.767	2.770
Excav struct, Cl 20	cy	0.799	3.047	2.370	2.644
Cl 21	cy	3.807	18.411	16.447	16.361



FOR FAST EXCAVATING AND EARTHMOVING

Dependable Hydraulic Action . . . Economical Diesel Power!

Here's an excavating, earthmoving, and bulk material handling "team" that can't be beat—

- **The Sherman Power Digger**—Excavates to 10′ below grade. Trenching and bellhole shovels, 12″ to 39″ wide.
- **The Sherman Front End Loader**—Bucket lift, 10′10″. More reach than any comparable machine. Load capacity to 2500 pounds, ⅝ cubic yard.

Mounted on the economical Fordson Major Diesel Tractor, both are low in initial cost and upkeep. Sold and serviced by Ford Tractor dealers everywhere. Ask your dealer for an on-the-job demonstration . . . or write for free literature on both machines to Dept. No. 1413.

The Sherman Power Digger is designed, engineered and manufactured jointly by the Sherman Products, Inc., Royal Oak, Michigan and Wain-Roy Corp., Hubbardston, Mass. Patent No. 2-303-852, others pending.

★ ★ ★

The Sherman Front End Loader is manufactured exclusively for Sherman Products, Inc., by Johnson Hydraulic Equipment Co., Minneapolis, Minn.

★ ★ ★

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Sherman
PRODUCTS, INC.
ROYAL OAK, MICHIGAN

Sherman SP Products ®

Maine Highway Prices

1954 Contract prices on primary and secondary roads in weighted averages, by Maine State Highway Commission Primary Highway System, FAS projects not included

Items	Unit	Quantity	Price '54 Av
Clearing	acre	113	$399.56
Removing trees, 9"–24"	ea	327	45.12
Removing trees, over 24"	ea	111	120.14
Excavation, earth	cy	553,791	0.72
Rock	cy	28,595	3.58
Unclassified	cy	274,600	1.13
Muck	cy	10,600	0.59
Exc & drainage, struct earth	cy	19,000	2.45
Rock	cy	3,070	11.91
Exc abut & ret walls			
Struct earth	cy	1,955	3.10
Rock	cy	18	12.00
Exc piers, struct earth	cy	380	6.32
Rock	cy	20	25.00
Channel	cy	1,450	1.23
Remov exist concrete	cy	24	23.75
Rail	lf	328	1.00
Common borrow	cy	210,000	0.56
Granular borrow	cy	219,000	0.65
Gravel borrow	cy	400	1.20
Gravel base crse, ipm	cy	330,790	0.78
Cr grav base crse, ipm	cy	40,000	1.47
Washed grav base crse, ipm	cy	43,000	1.65
Grav base course A ipm	cy	140,000	1.34
B ipm	cy	213,000	0.94
pit meas	cy	7,300	0.80
Bit macadam base crse	ton	14,000	6.09
Bit conc base crse	ton	22,962	7.90
Levelling course	ton	62	9.70
Stripping pits	cy	42,070	0.26
Stripping pits	cy	57,070	0.35
Sprinkling	Mg	7,350	4.69
Calcium chloride	ton	296	76.23
Gravel surface course	cy	46,710	2.91
Bit grav surf crse, premix	cy	200	10.00
Bit macadam surf crse	ton	6,150	6.85
Bit conc surf, type A	ton	24,105	9.14
Type A, crushed grav	ton	34,600	8.93
Type B	ton	21,800	8.86
Bit conc curb & sidewalk	ton	570	15.88
Road tar	gal	118,000	0.29
Asphalt cement	gal	127,100	0.185
Emulsified asphalt	gal	101,000	0.21
Cut-back asph, med curg type	gal	67,490	0.23
Tack coat	gal	20	0.30
Cor metal pipe, 12"	lf	648	2.36
15"	lf	5,540	2.59
18"	lf	2,243	2.97
24"	lf	773	4.53
36"	lf	30	10.00
Relaying	lf	755	1.36
Asph coated CMP 8"	lf	550	2.18
10"	lf	348	2.20
12"	lf	1,664	2.60
15"	lf	1,428	3.13
18"	lf	6,380	3.50
24"	lf	4,080	5.21
30"	lf	914	6.69
36"	lf	583	10.02
42"	lf	438	12.42
48"	lf	255	15.24
60"	lf	119	27.31
72"	lf	238	35.31
Reinf conc pipe 12"	lf	508	2.99
15"	lf	496	3.58
18"	lf	5,149	4.27
24"	lf	3,586	6.51
30"	lf	826	7.93
36"	lf	480	11.66
42"	lf	316	13.33
48"	lf	384	18.00
72"	lf	36	40.00
Conc sewer pipe 8"	lf	560	3.00
Vitrified clay pipe 6"	lf	259	1.25
8"	lf	128	1.90
10"	lf	206	2.01
Drop inlets, type A	ea	3	125.00
Type B	ea	9	219.44
Catch basins, type A	ea	74	232.84
Type C	ea	31	244.35
Type D	ea	13	248.46
Manholes, type A	ea	8	232.50
Type B	ea	1	240.00
Adj CB & MH to grade	ea	34	52.79
Traps, 8"	ea	36	31.50
12"	ea	6	40.00
Underdrain type B	lf	20,850	1.90
Type C 12"	lf	940	3.26
15"	lf	941	4.14
18"	lf	752	4.42
Underdrain outlets	lf	1,890	1.50
PC conc, abut & ret walls	cy	1,890	40.00
Piers	cy	566	41.91
Floor slabs	cy	159	44.09
Superstruct slabs	cy	368	53.91
Rdwy & sidewlk slabs, on steel bridges	cy	338	72.67
Superset T-beam type	cy	164	55.00
Wearing surf on bridges	cy	93	35.00
Rail	lf	399	8.07
Steps	cy	14.5	81.92
Approach slabs	cy	101	32.57
Culvert connections	ea	18	60.45
Portland cement	bbl	5,105	5.67
Expansion bearings	set	6	40.00
Steel struct, fab & del	lb	413,600	0.103
erect	lb	413,600	0.036
Wrought iron shells	lb	33,550	0.34
Struct plate pipe, 120" φ	lf	190	66.95
Arch 14' x 7', 3"	lf	89	45.00
Steel reinf, del	lb	238,718	0.10
Placing	lb	238,718	0.033
Crsed mortar masnry, 2nd cl	cy	109	88.41
Timber piles, untreated	lf	1,580	2.50
Steel H-beam piles, 42 lbs/'	lf	153	6.00
French drains	cy	310	3.31
Wrght iron rail, d&e	lf	716	12.55
Granite curb	lf	9,980	4.02
circular	lf	610	5.32
sloped	lf	33	6.50
sloped, circular	lf	23	8.00
Granite edging	lf	3,820	3.18
circular	lf	300	4.37
Field stone curb	lf	250	1.00
Plain conc sidewalk	sy	90	4.00
Guard rail, Type A	lf	70	1.35
Type C	lf	60,680	1.63
Anchors for guard rail			
Type A & B	ea	2	28.00
Type C	ea	450	33.04
Guard posts, Type A	ea	499	6.30
Fencing, wood posts	lf	890	0.54
Metal posts	lf	7,700	0.50
Barways, wood posts	ea	2	25.00
Metal posts	ea	9	40.00
Drive gateways, 12'	ea	4	25.00
Relocat woven wire fence	lf	1,286	0.46
Wooden rail fence	lf	340	0.40
Wooden gates	ea	2	20.00
Stone fill	cy	15	6.00
Lay outer face of rck fill	sy	1,300	1.50
Plain riprap	cy	65	5.00
Hand-laid riprap	cy	1,157	8.12
Loam excavation	cy	5,400	2.51
borrow	cy	2,600	2.50
Sodding	sy	15,726	1.31
Seeding, roadside mix	Msf	480	11.25
parkway mixture	Msf	98	13.48
Slope checks	lf	3,350	0.40
Hay mulch	t	38	40.00
Project markers	ea	11	23.64
Right-of-way monuments	ea	932	12.45
Underdrain outlet markers	ea	39	6.79
Traffic officers	mhr	7,180	1.45
Plank curb	lf	10,895	0.63
Metal sluice	lf	1,049	3.48
Galvanized steel pipe 2"	lf	380	1.08
Copper tubing, 1"	lf	460	1.04
Capping spring	ea	1	200.00
Remov exist conc pavement	sy	1,900	1.00

Secondary Highway System

Items	Unit	Quantity	Unit Prices—1954 Av Aver Low	Low Bid	High Bid
Clearing	acre	177.70	$336.80	$156.50	$500.00
Remov trees, 9"–24"	ea	296	35.69	20.00	60.00
over 24"	ea	76	81.71	40.00	200.00
Excavation earth	cy	720,400	0.68	0.50	1.25
rock	cy	43,525	3.08	1.25	10.00
unclassified	cy	7,900	2.20	2.20	2.20
muck	cy	23,580	0.56	0.50	0.80
Excav&drain,					
struct earth	cy	24,545	2.42	1.60	3.00
struct rock	cy	1,720	17.62	10.60	20.00
Exc abut & ret walls,					
struct earth	cy	2,030	4.33	4.25	10.00
struct rock	cy	170	20.00	20.00	20.00
Exc chanl, struct earth	cy	960	1.31	0.65	3.00
Remov exist conc	cy	45	45.00	45.00	45.00
rail	lf	183	7.00	7.00	7.00
Common borrow	cy	134,000	0.57	0.30	0.70
Granular borrow	cy	101,850	0.66	0.50	0.70
Gravel borrow	cy	212,000	0.77	0.70	1.50
Remov granlr borrow surf	cy	22,500	0.25	0.25	0.25
Sand base crse, ipm	cy	55,000	0.88	0.85	0.90
Grav base crse, ipm	cy	270,900	0.92	0.70	1.00
pit measure	cy	114,200	1.05	0.70	1.25
A ipm	cy	40,000	1.65	1.65	1.65
Overhaul, ipm	ymi	213,750	0.10	0.10	0.10
Stripping pits	cy	58,500	0.25	0.20	0.35
Sprinkling	unit	6,100	4.75	3.00	7.00
Calcium chloride	t	265	84.02	50.00	100.00
Grav surf crse	cy	40,530	3.05	2.00	4.00
Bit grav surf crse, MIP	cy	11,105	3.28	3.00	5.00
pre-mix	cy	60	8.00	8.00	8.00
Stone chips	t	1,430	8.31	8.00	9.00
Bit macadam surf crse	t	13,065	5.20	5.15	15.00
Bit conc surf crse, Type A	t	16,200	9.83	9.00	13.25
Type B	t	17,380	8.89	8.50	9.50
Type C	t	25,500	7.45	7.45	7.45
Road tar	gal	421,200	0.25	0.21	0.35
Asphalt cement	gal	145,000	0.16	0.16	0.16
Emuls asph, quick set	gal	1,300	0.30	0.30	0.30
Cutback asph, rap cure	gal	29,400	0.25	0.20	0.30
med cure	gal	196,300	0.22	0.20	0.24
CMP 10"	lf	106	2.10	2.10	2.10
12"	lf	5,962	2.38	2.00	2.50
15"	lf	3,380	2.73	2.50	3.00
18"	lf	1,335	3.36	3.00	3.50
21"	lf	95	3.70	3.60	3.75
24"	lf	239	4.45	4.25	4.50
30"	lf	173	5.91	5.50	6.00
ACCMP 10"	lf	250	2.25	2.25	2.25
12"	lf	2,635	2.62	2.25	2.75
15"	lf	2,362	3.19	3.00	3.50
18"	lf	12,273	3.63	3.40	4.00
21"	lf	290	4.12	4.25	4.60
24"	lf	3,073	5.31	5.00	6.00
30"	lf	1,091	7.12	6.25	7.50
36"	lf	566	11.80	10.00	12.00
42"	lf	271	11.70	11.00	12.00
48"	lf	354	14.93	13.50	17.00
ACCMP 60"	lf	155	25.00	25.00	25.00
72"	lf	447	33.43	31.26	35.00
84"	lf	80	40.00	40.00	40.00
RCP 12"	lf	120	3.00	3.00	3.00
18"	lf	92	4.00	4.00	4.00
30"	lf	8	10.00	10.00	10.00
RCPES 36"	lf	84	12.00	12.00	12.00
42"	lf	96	16.00	16.00	16.00
48"	lf	100	18.00	18.00	18.00
VCP 8"	lf	28	2.00	2.00	2.00
Drop inlets, Type B	ea	2	250.00	200.00	300.00
Catch basins, Type A	ea	55	246.45	200.00	260.00
Type C	ea	20	235.25	225.00	300.00
Type D	ea	20	236.00	220.00	280.00
Manholes, Type B	ea	2	300.00	300.00	300.00
Trap	ea	1	50.00	50.00	50.00
Catch basins, Type E	ea	5	300.00	300.00	300.00
Adj exist DI, CB, MH	ea	9	100.00	100.00	100.00
Underdrain, Type B	lf	25,375	2.07	1.75	2.50
Type C, 12"	lf	2,188	3.39	2.60	4.00
15"	lf	1,044	3.74	3.50	4.50
18"	lf	1,292	4.71	4.00	5.00
Underdrain outlets	lf	3,259	1.42	1.00	2.00
PC conc, floor slabs	cy	299.40	39.11	35.00	65.00
Abut & ret walls	cy	835	49.89	40.00	65.00
superstructr slab	cy	122	40.00	40.00	40.00
T-beam type	cy	98	60.00	60.00	60.00
culv end walls	cy	3.5	65.00	65.00	65.00
rail	lf	85	8.00	8.00	8.00
Portland cement	bbl	1,892	6.33	5.00	6.50
Struct plate pipe, 102"	lf	128	58.00	58.00	58.00
144"	lf	150	120.00	120.00	120.00
Reinf steel, del	lb	81,725	0.13	0.10	0.15
placed	lb	81,725	0.05	0.04	0.05
Steel wire mesh	lb	75	0.20	0.20	0.20
Remov exist superstr, ret by comm	ls	2	200.00	200.00	200.00
Cofferdams	ls	2	6,500	6,500	6,500
French drains	cy	25	4.00	4.00	4.00
Granite curb	lf	945	5.11	4.80	6.00
circular	lf	117	6.82	6.50	7.00
sloped	lf	766	5.85	5.50	7.00
sloped, circular	lf	175	8.00	8.00	8.00
Granite edging	lf	390	3.73	3.00	4.00
circular	lf	64	11.41	5.00	15.00
Granite curb, Type II	lf	8,948	3.22	2.55	3.75
circular	lf	675	6.11	5.00	7.50
Field stone curb	lf	4,600	1.53	0.95	3.00
Plain conc sidewalk	sy	31	6.23	3.00	7.00
Reinf conc steps	cy	19	88.95	60.00	100.00
Guard rail, Type A	lf	28,850	1.24	1.10	1.40
Type B	lf	2,150	1.35	1.35	1.35
Type C	lf	7,311	1.56	1.55	1.60
Type E	lf	369	3.50	3.50	3.50
Anchor, gd rail Tp A&B	ea	198	28.40	25.00	30.00
Type C	ea	66	31.82	30.00	32.00
End wings	ea	6	10.00	10.00	10.00
Guard posts, Type A	ea	651	6.33	5.00	7.00
Type B	ea	30	6.00	6.00	6.00
Type A, resetting	lf	350	0.50	0.50	0.50
Anchor, A gd rail, reset	ea	4	25.00	25.00	25.00
Fencing, wood posts	lf	31,875	0.44	0.40	0.60
metal posts	lf	1,000	0.45	0.45	0.45
Barways, wood posts	ea	37	27.08	15.00	50.00
metal posts	ea	2	30.00	30.00	30.00
Fence, picket....r&r	lf	300	1.00	1.00	1.00
Wire rem & relay	lf	100	1.00	1.00	1.00
Plain riprap	cy	1,220	5.16	5.00	7.00
Hand laid riprap	cy	910	8.50	7.00	10.00
Loam excavation	cy	3,450	3.13	3.00	3.50
Loam borrow	cy	7,165	2.89	2.00	3.50
Sodding	sy	46,960	1.40	1.10	1.50
Seeding, roadside mix	unit	587.5	14.06	8.50	15.00
parkway mix	unit	89	16.27	13.00	25.00
Transplant hedges	lf	600	1.00	1.00	1.00
Plant hedges, 3' min	ea	12	55.00	55.00	55.00
Slope checks	lf	14,800	0.37	0.20	1.25
Proj mrks, set only	ea	23	14.22	10.00	25.00
Settlement plates	ea	8	25.00	25.00	25.00
ROW monuments	ea	857	12.04	9.00	15.00
Underdr outlet mkrs	ea	42	6.64	4.00	20.00
Traffic officers	mh	4,990	1.51	1.25	1.65
Plank curb	lf	2,760	0.64	0.55	1.00
Metal sluice	lf	460	4.07	3.00	5.00
Granite steps....r&r	stp	14	5.00	5.00	5.00

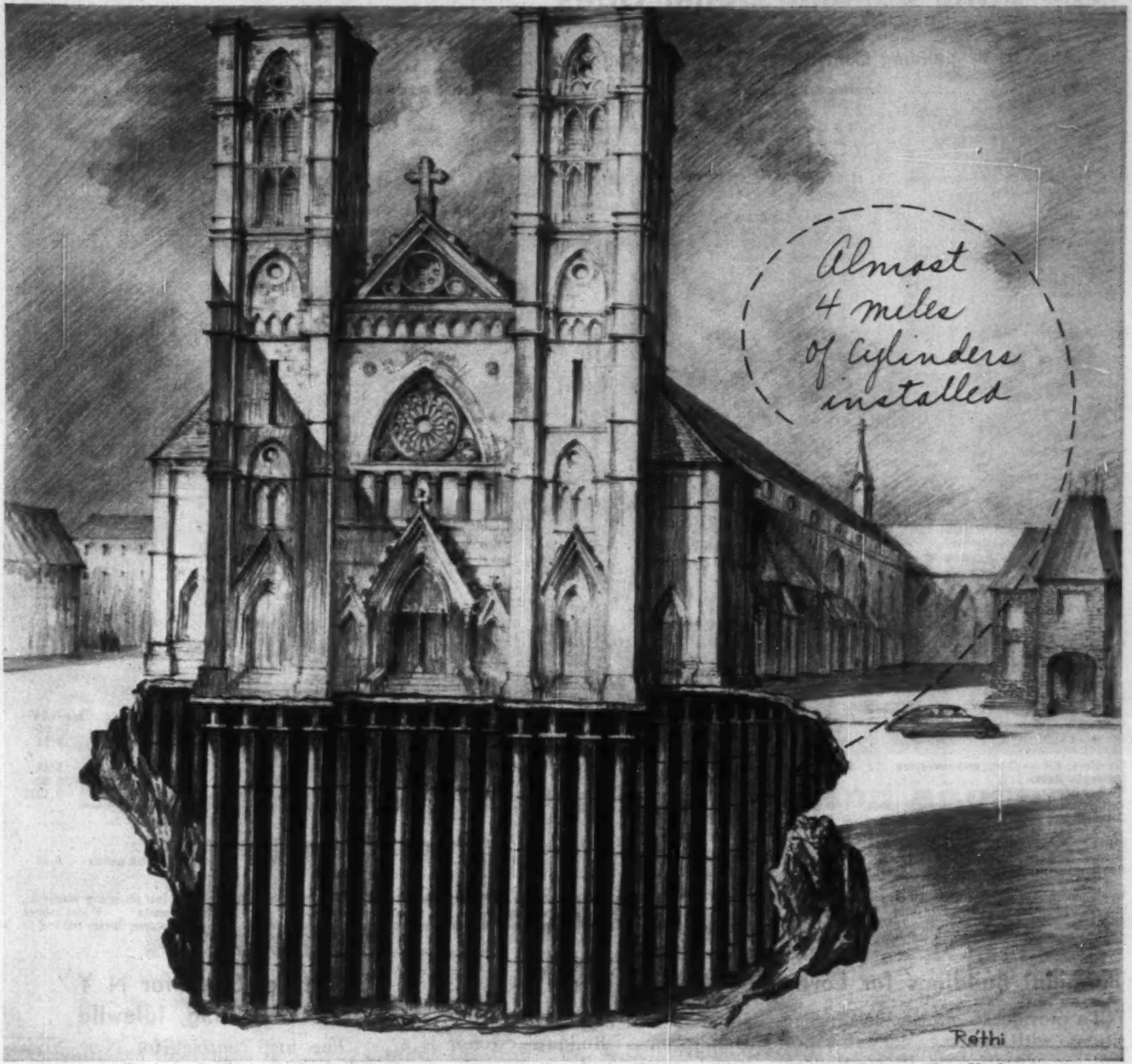
House moving items

Items	Unit	Quantity	Aver Low	Low Bid	High Bid
Excavation	cy	675	1.00	1.00	1.00
Rock	cy	25	15.00	15.00	15.00
Borrow, gravel	cy	125	1.00	1.00	1.00
Loam	cy	525	3.00	3.00	3.00
Concrete	cy	70	70.00	70.00	70.00
Conc block masonry	blck	970	1.00	1.00	1.00
VCP 4"	lf	600	1.00	1.00	1.00
Sept tnks&75' absrptn trench, 250 gal	ea	2	400.00	400.00	400.00
Sleeve posts	ea	4	25.00	25.00	25.00
Movng &/or raz & alt					
bldg A	ls	2	2,000	1,500	2,500
bldg B	ls	1	2,500	2,500	2,500
Seeding, park mix	unit	22	20.00	20.00	20.00
Constr 2-car garages	ea	2	1,500	1,500	1,500
18" ACCMP.......r&r	lf	46	1.00	1.00	1.00
Relay 15" CMP	lf	46	1.78	1.50	2.00
24" CMP.........r&r	lf	70	2.50	2.50	2.50
Moving garages	ls	1	1,500	1,500	1,500
Chain saw & operator	mh	140	5.00	5.00	5.00

• ipm in place measure • pm pit measure

• fde fabricated, delivered & erected • r&r remove & reset

ANOTHER PROBLEM SOLVED BY SPENCER, WHITE & PRENTIS



Project: St. Joseph's Cathedral, Hartford, Conn. • *Engineers:* Lockwood Greene Engineers, Inc., New York
Architect: Maginnis and Walsh, Boston, Mass.

PRETEST UNDERPINNING STOPS SETTLEMENT AS COLLAPSE THREATENS

This 31,000-ton 19th century cathedral was sinking into the clay. Masonry had cracked badly and collapse threatened when our organization, as specialists in underpinning, was called upon. Nearly 4 miles of Pretest Cylinders now give secure support, with ample safety margin. This represents one of the largest single underpinning operations ever performed.

LITERATURE ON REQUEST

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Where the Building Dollar Goes

Cost Analysis by Building Contractors for Engineering News-Record

Type of Building	Hospital Add'n	Novitiate	Jr-Sr High School	Mfg Plant Precision Instru	Air Passenger Terminal	High School	Elem. School	Warehouse River Terminal	Bank Building & Parking Garage—Combination		
Type of Construction: frame	S & C fr	Mas, S & C fr	Mas, S & C fr	Steel & Conc.	Steel	Steel	Steel	Steel	Steel	Concrete	
outside walls	Brick	Brick	Brick	Limestone	Brick	Brick	Brick	Brick	Porcelain Panels & Aluminum		
Date of construction, start—complete	11/54-6/56	9/55-9/56	6/53-1/55	10/51-5/53	6/52-7/53	5/54-8/55	4/55-12/55	10/54-10/55	July, 1954	July, 1954	
Location of building	Maryland	Maryland	Maryland	Long Island, New York	New Jersey	Virginia	Virginia	Tennessee			Texas
Height, stories	7 & B	2 & 3 & B	2 & 1	2	Part 1, 2, 3	1 & 2	1 & 2	1 Story	8-2 pent.	2	
Floor area, sq ft	94,444	98,838	163,226	393,631	185,373	104,252	39,004	28,800	93,650	56,972	150,622
Volume, cu ft	13,518	1,123,776	2,993,636	6,975,493	5,080,640	1,233,258	515,392	777,600	1,164,912	683,664	1,848,576
% of floors (volume) air conditioned	Op rms only	None	None	70	15	0	0	None	90	......	60
Unit cost: per sq ft	$16.37	$12.29	$13.57	......	......	$11.432	$12.68	$41.33	......	......	$13.49
per cu ft	$ 1.09	$ 1.08	$ 0.74	......	......	$ 0.9664	$ 0.959	$ 1.53	......	......	$ 1.10
per classroom	......	......	......	......	......	$30,560[k]	$29,087[l]	......	......	......	......
Principal Items of Cost	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total
Excavation and site improvements	2.1	1.4	7.9	4.28	1.74	3.41	7.08	6.45	......	......	1.27
Foundations	2.0	2.2	2.7	9.36	....	1.00	0.81	46.63	......	......	6.57
Structural frame	16.7	10.5	10.5	16.95	26.38	14.07	13.75	4.31	......	......	15.21
Cement finish work	0.9	0.9	1.0	0.63	....	....	0.27	0.45	......	......	1.25
Exterior masonry	7.6	13.2	13.0	6.78	11.42	14.26	10.11	4.16	......	......	2.16
Metal siding	....	....	....	....	0.44[h]	None	None	....	......	......	8.40
Interior partitions	3.9	2.8	5.5	1.51	With ext. mas.	8.52	6.57	0.007	......	......	0.52
Carpentry and millwork	2.8	3.4	3.5	0.11	1.95	4.87	5.66	0.30	......	......	0.63
Sash and glazing	3.5 A	2.6	3.3	1.11	1.79	1.68	4.10	0.001	......	......	2.44
Doors	0.5	1.2	see Holo Met	0.38	0.34	Millwork	Millwork	1.13	......	......	0.78
Roofing, sheet metal, insulation	0.7	2.3	1.7	2.81[c]	2.37[a]	2.72	1.52	1.54	......	......	0.56[a]
Waterproofing and dampproofing	0.6	0.8	0.7	0.25	0.25	2.18	0.72	....	......	......	0.78
Metal lath, furring, and plastering	3.3	5.2	0.6	3.72	2.54	4.87	1.74	....	......	......	3.91
Hollow metal work	0.9	1.2	0.8	0.28	0.43	....	0.79	....	......	......	0.26
Miscellaneous iron and ornamental metal	1.2	1.6	4.3	1.11	7.25	1.68	4.04	0.045	......	......	0.25
Tile, terrazzo, and marble	2.9	2.4	2.0	1.67	2.08	8.80	1.51	....	......	......	1.20
Floor covering	0.8	1.7	0.5	2.17	0.14	0.88	1.85	0.002	......	......	1.10
Painting	1.6	1.5	1.7	0.30	1.11	1.67	1.76	1.68	......	......	0.59
Finish hardware	2.5	0.5	1.2	0.12	0.22	0.65	1.04	....	......	......	0.59
Acoustical ceilings	0.9	0.2	1.4	1.94[c]	1.59	1.17	2.41	....	......	......	0.73
Vault doors	....	0.05	....	....	....	None	0.13	....	......	......	....
Kitchen equipment	4.5	0.8	1.0	3.38	2.64	sep contr	sep contr	....	......	......	....
Plumbing	see H&V	see H&V	see H&V	7.07[m]	see H&V	4.19	9.08	1.10	......	......	see H&V
Heating, ventilating, and air conditioning	25.1[b]	15.45[e]	20.3[e]	21.18	16.17[e]	12.58	14.84	1.30	......	......	19.95[e]
Electrical work and light fixtures	see H&V	3.7	8.2	11.29	17.28	6.29	4.15	1.69	......	......	9.24
Elevators, dumbwaiters, and conveyors	4.2	1.0	....	1.04	0.31	....	....	....	......	......	5.83
Incidental items	7.7	18.7	6.0	0.31	0.62	4.17	5.67	0.005	......	......	10.20
Mail or laundry chutes	0.1 L	0.3 L	....	....	....	....	....	....	......	......	0.12M
Vertical mail conveyors and pneumatic tubes	0.5 pt	....	....	0.25	....	....	....	....	......	......	....
Counters and display cases, spec cabinets	2.5[d]	....	1.7	....	....	0.06	....	....	......	......	....
Intercommunication systems and television	....	1.7	....	....	....	0.28	0.40	....	......	......	....
Unusual features	....	1.8[f]	0.5[g]	....	0.94[i]	....	....	29.20[j]	Porcelain facing panels		5.46
Refrigeration	....	0.9	....	....	....	....	....	....	......	......	....

A aluminum   S steel   C concrete   Mas masonry   H&V heating & ventilating   pt pneumatic tubes   [a] insulation $0.07   [b] incl plumbing, electrical, laundry equipment, oxygen supply lines   [c] incl deck   [d] special metal cabinets   [e] incl plumbing   [f] pews & vestment cases   [g] auditorium seats   [h] incl interor partitions   [i] display signs   [j] railroad trestle   [k] gym, cafeteria, auditorium, library not incl in classroom count for figuring unit cost   [l] cafeteria, library not incl in classroom count for figuring unit cost   [m] and sprinklers

Terminal Buildings for Love Field Airport, Texas

To provide 26 airplane loading positions with moving sidewalks now and for expansion to 30 positions in the future, Dallas has a new $6.5 million terminal building development underway at Love Field Airport. Associated architects and engineers are Broad & Nelson and Jack Corgan of Dallas. Mechanical and electrical engineers are Zumwalt & Vinther, also of Dallas.

Work must be complete in 22 months with liquidated damages of $50 a day thereafter. It includes a 2-story main building 284 ft x 241 ft x 40 ft with 1-story wings, a 4-story office section with the airport control tower four stories above the office section. A mail and air cargo building 80 ft x 450 ft and a mechanical service building 63 ft x 123 ft are part of the project which is laid out for minimum interference of passenger traffic within the terminal. Moving sidewalks help passengers to and from planes. Building exterior is a metal curtain wall.

Wages range from $1.45 for common labor to $2.75 for carpenters, $3.4375 for plasterers and $3.50 for bricklayers.

The structures account for 473,740 sq ft, distributed like this:

Main Building	sq ft	284,570
Mail and Air Cargo Building		42,890
Mechanical Service Building		15,350
Bridges, Loading Piers, & Misc		130,930

Prime Contractors, with lump sum contracts, are:

	Contract	% of Total
General: T. C. Bateson Constr. Co	$4,243,899	65.13
Mechanical: Kieffer Plumbing & Heating Co	1,310,781	20.12
Electrical: Fischbach & Moore of Texas	530,618	8.14
Outside Utilities: E. H. Reeder Constr Co	93,026	1.43
Elevators: Hunter Hayes Elevator Co.	50,950	0.78
Escalators: Otis Elevator Co	52,414	0.80
Moving Sidewalks: Hewitt-Robins Co, Passaic, N. J.	234,703	3.60
Total	$6,516,391	100.00

All contractors are from Dallas except as noted.

Structural Steel for N Y Arrival Building, Idlewild

The first contract for New York City's $15 million International Arrival Building and Airline Wing Buildings is for furnishing and erecting 6,700 tons of steel that will enclose more than half a million square feet of floor area. This is part of the New York Port Authority's $60-million terminal development at International (Idlewild) Airport, ENR Mar. 10, p. 46. Skidmore, Owings and Merrill, New York, are architects. John J. Fitzgerald, Jr., is deputy chief engineer for the Port Authority.

Bidders include:

1C	Harris Structural Steel Co., Inc., New York	$1,920,700
2	American Bridge Div., U. S. Steel Corp., N. Y.	1,976,220
4	Bethlehem Steel Co., New York	2,044,200

Bids: 8-30-55 Items	Unit	Quantity	Unit Prices 1C	2
Steel, struct, except open web joists, furnish	lb	12,000,000	$0.1125	$0.1178
erect			0.03	0.029
Open web joists, furnish	lb	1,400,000	0.12	0.1243
erect			0.0305	0.029

Brady Group of Dormitories, Michigan State University, East Lansing. Architect: Ralph R. Calder, Detroit.

General Contractor: Christman Co., Lansing. Concrete Work: The Hausman Steel Company, Toledo.

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2 Gyms and Swimming Pool for Massachusetts College

The $1-million gymnasium-swimming pool building for State Teachers College at Bridgewater, Mass., went under contract to Poorvu Construction Company for $100,000 less than the architect's estimate. Nine bidders competed for this job which includes a 289-ft x 140-ft building with 9 outside corners, 44-ft height, two gymnasiums, a swimming pool, offices, three classrooms, lockers and showers. The swimming pool has six lanes, is 42-ft x 75-ft, 12-ft to 3-ft-6-in deep. Harry Gulesian, Boston, is the architect.

Cost excluding walks and grading is $1,021,665 which is $0.83 per cu ft and $16.79 per sq ft, based on a cube of 1,231,100 and floor area of 60,857 sq ft. This price includes furnishings and the total contract price includes grading for the athletic field.

Considerable sub-surface water on the lot will complicate construction work. Concrete is required to test at 3,000 and 2,500 psi.

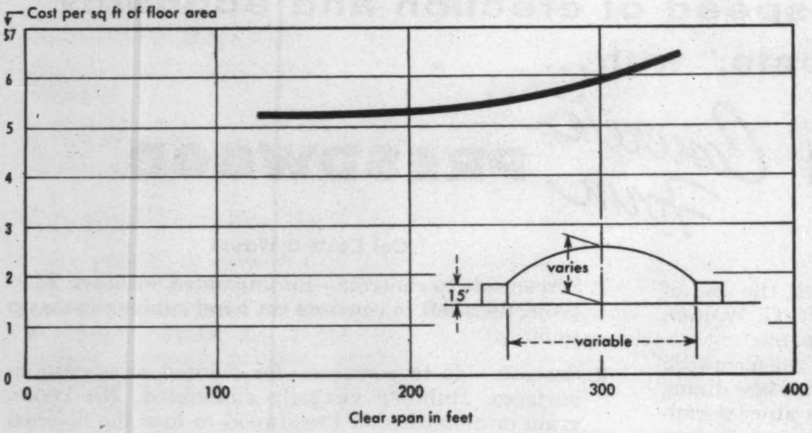
An analysis of the bidding includes:

1C	Poorvu Construction Co	$1,028,444
2	G. L. Rugo & Sons	1,044,000
9	Bossi Constructors, Inc	1,095,659
AE	Harry Gulesian, Boston, Mass	1,120,000

Items	Total	% of Total	$/cf	$/sf
Structure	$685,709	67.2	0.557	11.27
Plumbing	66,887	6.5	0.054	1.10
Heating & ventilating	172,986	16.9	0.141	2.84
Electrical	56,344	5.5	0.046	0.93
Equipment	39,739	3.9	0.032	0.65
Total	$1,021,665*	100.0	0.830*	16.79*

Completion time: 365 calendar days

* excl. walks and grading



Costs of Concrete Barrel Arches

Using mostly actual costs of thin-shell, reinforced concrete arched roofs for hangars, Ammann & Whitney, consulting engineers, New York City, prepared the above chart. It shows how the cost of arched-roof buildings per square foot of floor area varies with arch span.

Costs for spans over 250 ft were estimated.

The design is based on concrete shells about 3½ in. thick and ribs spaced 30 ft c-c, with the springing line 15 ft above the floor. Leantos were assumed to be 16 ft wide.

Costs include those for shell, ribs, abutments, foundations, excavation, grading gravel backfill, insulation and roofing for the barrel arch; leanto roofs, roofing and insulation; rib flashing and concrete floor. Six uses of falsework for two spans were assumed. Total length of building was taken as 350 ft.

Low Maintenance and Repair Costs on Defense Housing

The low construction cost of $2,172 per dwelling unit for Benning Park Homes, Columbus, Ga., ENR July 16, 1942 p. 82 has been followed by low maintenance and repair costs that have kept this development on a self-liquidating basis, even a profitable one. This was permanent defense housing built to the standards of the Federal public housing program.

The 350 dwelling units are in 110 multiple dwelling buildings, 10 buildings with six units each, 45 buildings with four units each, and 55 buildings with two units each plus a management and maintenance building and a truck shed. The 50-acre site was improved with bituminous macadam pavements, concrete sidewalks, underground street lighting system, overhead electrical distribution, sewers and water supply facilities, automatic fire alarm system including complete central station equipment.

Construction included reinforced concrete foundations, concrete block foundation walls, 4-in. slab reinforced concrete first floor, wood joists for second floor, wood rafters and asphalt composition shingles for roof, oversized brick masonry in exterior walls, wood stud and plaster for interior partitions and steel sash for windows. The projects was reroofed in 1954.

Built under the Lanham Act, Benning Park Homes was managed for the Federal Works Agency by the Housing Authority of City of Columbus, Ga. until 1947 when $447,262 had been collected in income and $348,613 had been paid out for operating expense, including $76,209 for repairs, maintenance and replacement.

Since the transfer to the War Department operating income and expense are estimated to be $756,000 and $600,000 respectively, a return of $165,000 in six years.

Maintenance and Repair Costs, Benning Park Homes, Georgia

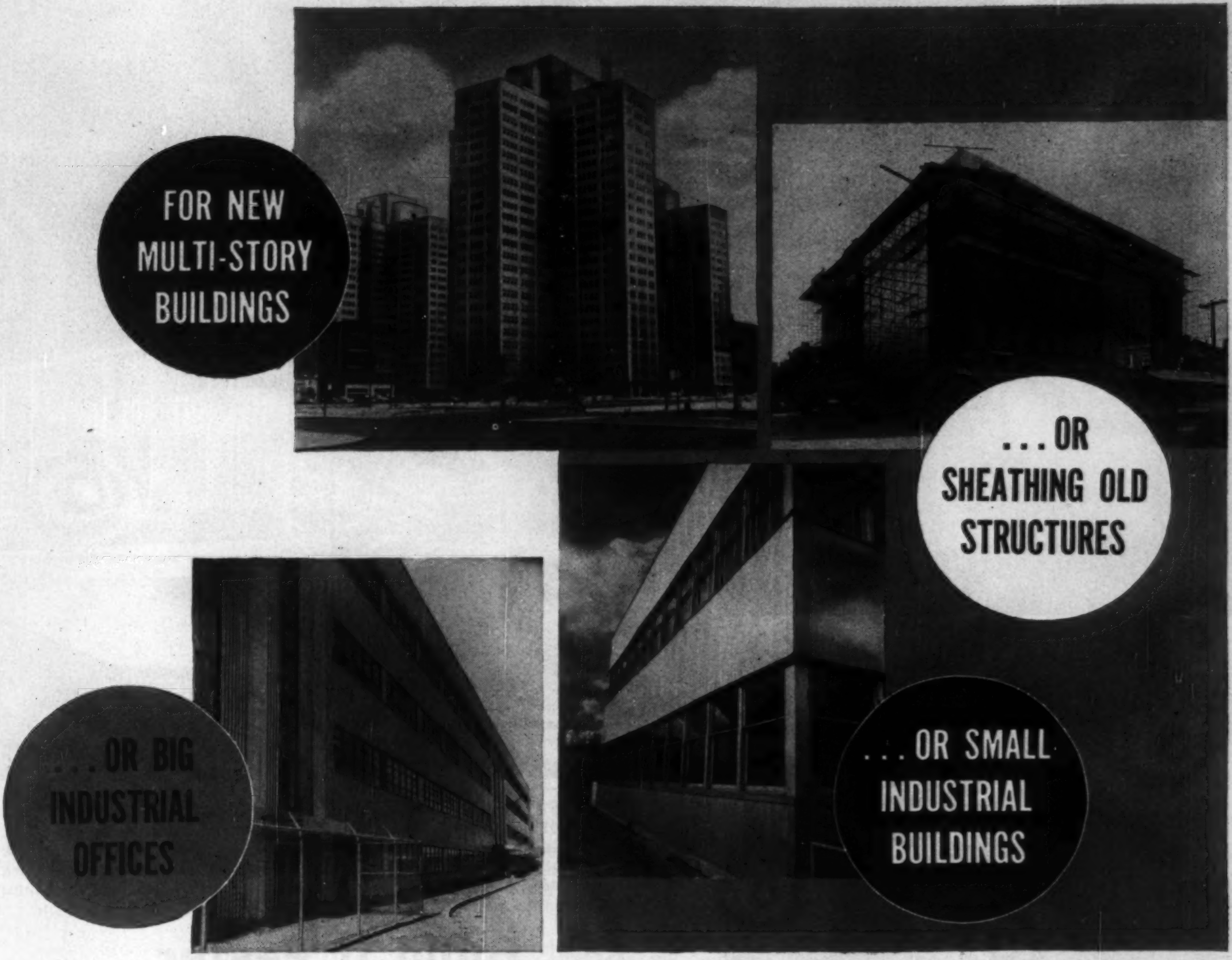
On Permanent Defense Housing Built 1941-'42 for $760,000

Year	Total	Year	Total	Year	Total
'42–'43	$7,448	'46–'47	$18,908	'50	$66,466
'43–'44	13,065	'47–6 mo.	2,929	'51	31,960
'44–'45	14,258	'48	20,401	'52	60,244
'45–'46	19,601	'49	53,445	'53	69,657

By Type	'48	'49	'50	'51	'52	'53
Water Systems	$48	—	$88	$7	—	$1,223
Sewage Systems	974	$157	25	—	—	1,977
Electric Systems	236	237	279	1,072	$1,315	528
Gas Distri.	—	—	—	—	16	319
Refrigeration	264	355	158	319	415	697
Buildings	15,158	45,915	34,251	24,076	53,607	57,252
Spec. Equip. & Misc. Struct.	54	5,265	4,980	5,089	4,130	6,140
Grounds	3,054	1,107	2,802	1,119	761	1,169
Surfaced Areas	613	409	23,883	278	—	352

1942–'47 Operated for Federal Works Agency by Housing Authority of City of Columbus, Ga.

1948—date Operated by War Department for military personnel at Fort Benning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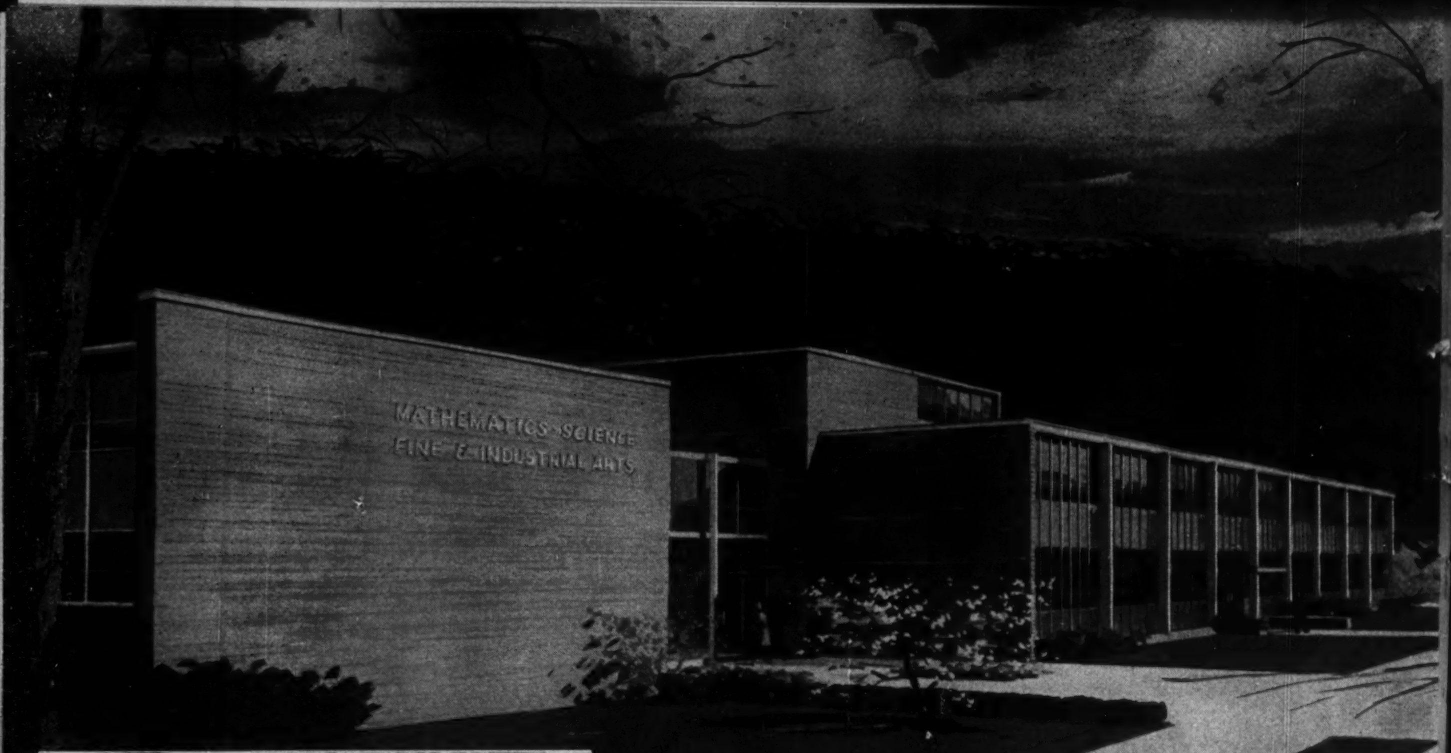
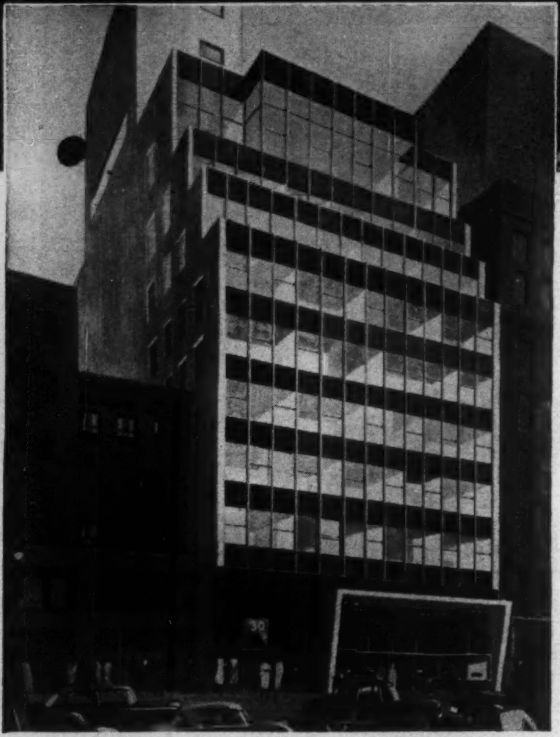


NEW JERSEY STATE TEACHERS' COLLEGE, MONTCLAIR, N. J. (2 bldgs.) Architect: Emil Schmidlin. Contractor: Martin Infante Co., Inc., Lodi, N. J. Lupton Curtain-Wall System, Type H. Width modules 3'9" & 4'1". Fixed glass and projected-in ventilators. Opaque areas are 1/8" thick embossed, fluted aluminum, Alumilited. Special features: Heavy aluminum sub-frames and door frames.



FIFTH AVENUE DIAMOND CLUB, NEW YORK CITY. Architects: Sylvan Bien & Robert L. Bien. Contractors: Kayfield Construction Corp. Lupton Curtain-Wall System Type H. Width Modules: 3'7" and 3'4". Ventilators: Project out for window cleaning only. 1/4 Plate Glass. Facing Material: 1/8" aluminum plate, Alumilited, 6" back up wall with air conditioning unit.

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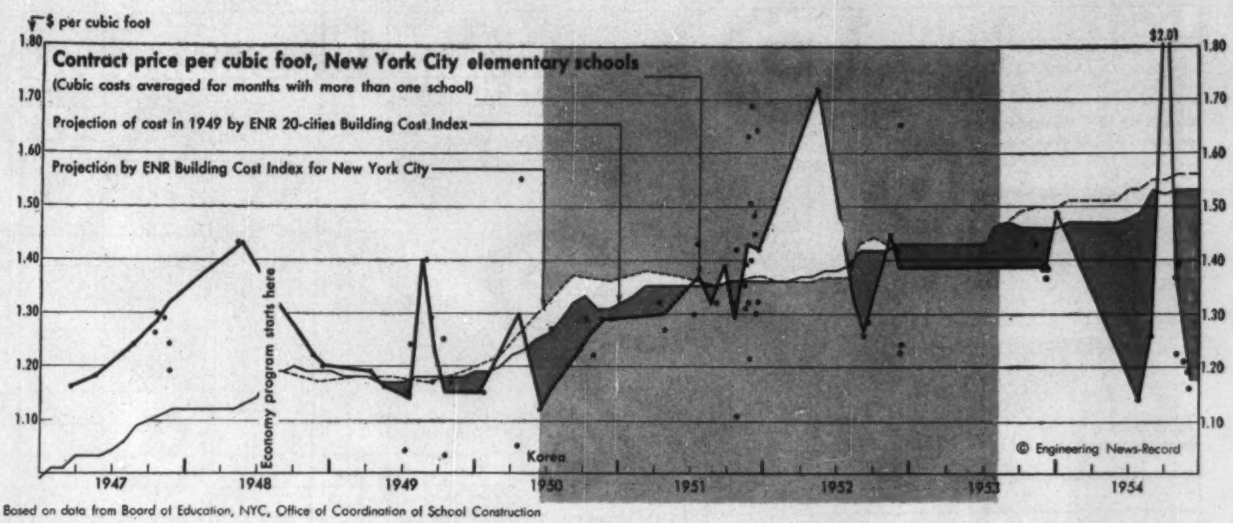


Based on data from Board of Education, NYC, Office of Coordination of School Construction

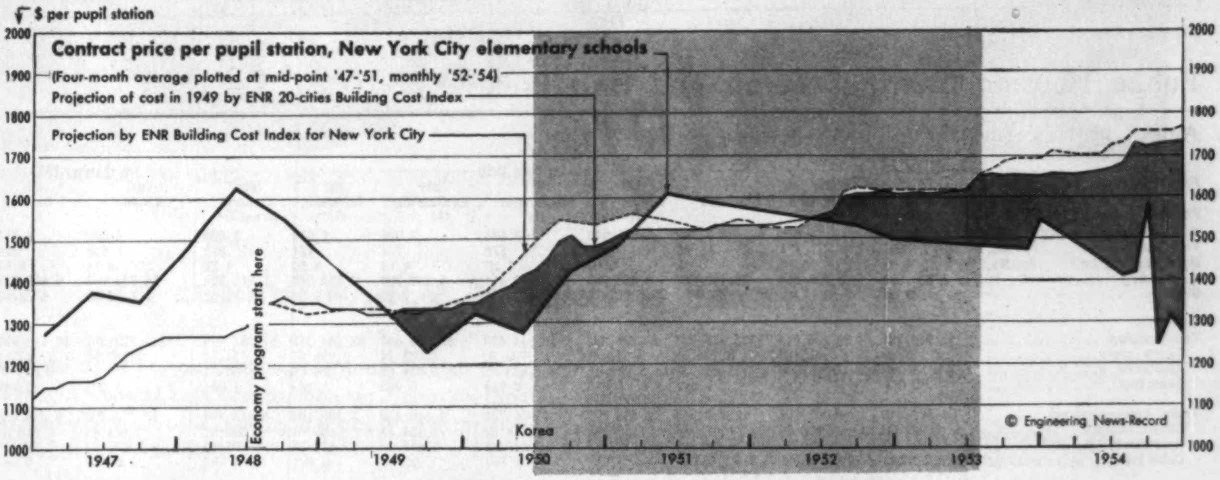
Unit Prices of Schools Built in New York City—by Years

Elementary schools

	no	per cu ft min	per cu ft aver	per cu ft max	per pupil sta min	per pupil sta aver	per pupil sta max	capacity, pupil stas min	capacity, pupil stas aver	capacity, pupil stas max
1947......	(9)	$1.16	$1.25	$1.56	$1,255	$1,517	$1,991	558	1,162	1,550
1948......	(5)	1.20	1.30	1.43	1,399	1,581	1,784	806	1,094	1,433
1949......	(12)	1.03	1.18	1.40	1,148	1,334	1,638	868	1,181	1,588
1950......	(11)	1.04	1.20	1.55	957	1,357	1,612	302	1,036	1,581
1951......	(24)	1.11	1.39	1.69	1,447	1,710	2,451	358	885	1,274
1952......	(9)	1.23	1.40	1.72	1,391	1,518	1,689	494	969	1,310
1953......	(6)	1.37	1.41	1.49	1,202	1,488	1,570	792	944	1,238
1954......	(9)	1.14	1.33	2.01	1,216	1,354	1,580	302	1,073	1,292

Junior high schools

	no	per cu ft min	per cu ft aver	per cu ft max	per pupil sta min	per pupil sta aver	per pupil sta max	capacity, pupil stas min	capacity, pupil stas aver	capacity, pupil stas max
1947......	(2)	$1.21	$1.23	$1.25	$1,270	$1,277	$1,284	1,810	2,068	2,326
1948......	(1)	1.32	1.32	1.32	1,623	1,623	1,623	1,518	1,518	1,518
1949......	(3)	0.99	1.09	1.26	1,261	1 380	1.553	1,518	1,819	1,998
1950......	(1)	1.07	1.07	1.07	1,210	1,210	1,210	2,012	2,012	2,012
1951......	(5)	1.32	1.36	1.38	1 408	1,511	1,645	1,558	1,842	2,020
1952......	(7)	1.10	1.22	1.31	1,187	1,342	1,451	1,732	1,813	2,056
1953......	(7)	1.10	1.22	1.29	1,176	1,280	1,462	1,766	1,968	2,185
1954......	(6)	1.10	1.23	1.30	1,237	1,322	1,517	1,694	1,969	2 136

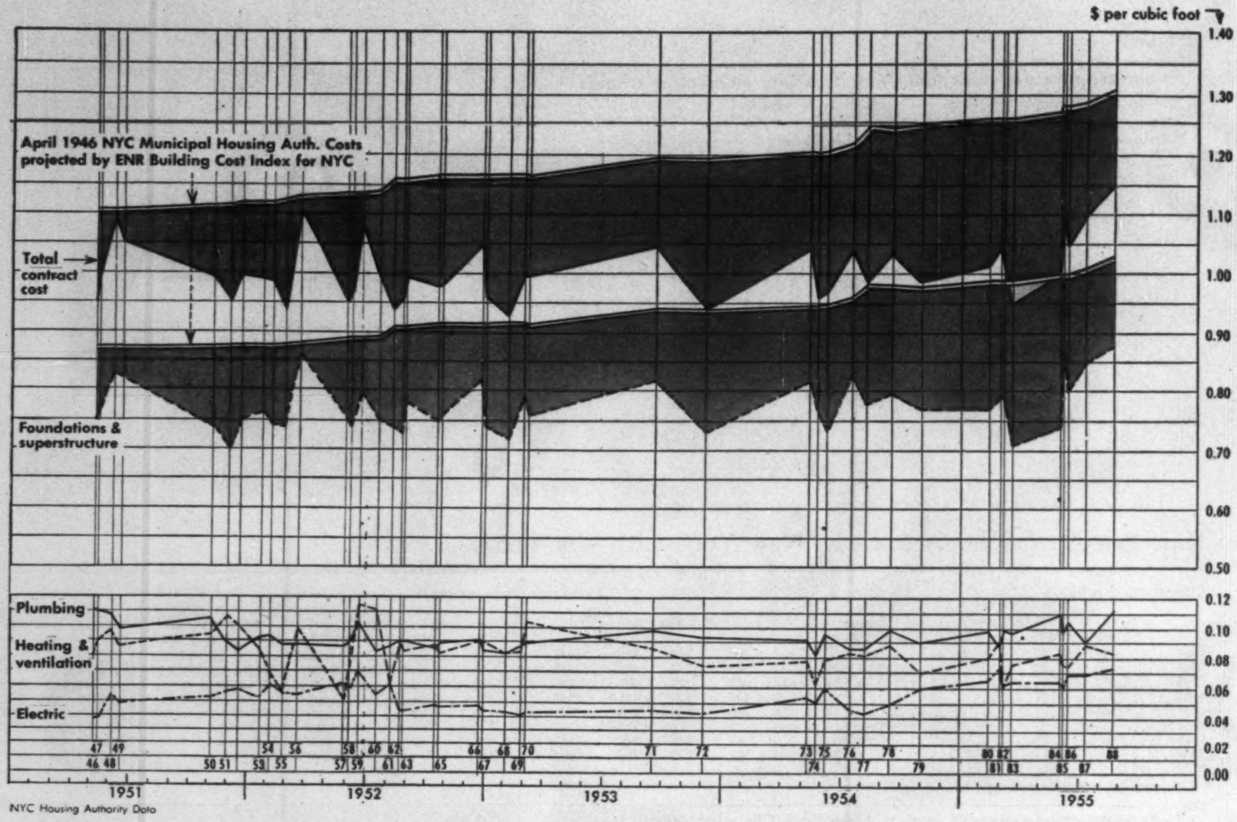


School Building Unit Contract Prices, New York City—1954

Bureau of Construction, Board of Education, City of New York

No.	Size, min-aver-max pupil station	Auditorium gymnasium	Min-aver-max COST per $/pupil station	Min-aver-max COST per $/cubic foot	Min-aver-max % of total bldg contract price* gen'l constr %	heating %	plumbing %	electrical %
Elementary schools, new 3-story								
6	1058–1148–1292	aud, gym, lnch-plyrm.....	$1,216–1,340–1,421	$1.14–1.27–1.39	71.8–74 5–76.7	10.6–11.1–12.9	4.9–5.4–5.9	7.3–9.0–10.5
Elementary schools, new basement 6 2-story								
2	1228–1237–1245	aud, gym, lnch-plyrm.....	$1,253–1,282–1,310	$1.16–1.175–1.19	70.2–70.6–70.9	12.5–12.7–12.9	5.6–5.7–5.7	11.0–11.1–11.2
Elementary school, new 1-story								
1	302	multi-purpose rm.........	$1,580	$2.01	73.2	12.3	7.6	6.9
Elementary school, additions								
1	252	3rd st; clrms only........	$661	$1.58	82.2	11.1	2.6	4.1
1	460	8 reg clrms; 5 spec.......	....	$1.68	73.5	10.0	6.5	10.0
Junior high schools, new 3-story								
4	1920–2037–2136	aud, gym, cafet...........	$1,237–1,274–1,350	$1.10–1.23–1.30	70.6–72.3–73.4	10.6–11.1–11.9	4.3–4.7–5.1	11.1–11.9–12.7
1	1694	K-9, aud, gym, cafet......	1,517	$1.23	73.0	11.2	4.2	11.6
Junior high school, new 4-story								
1	1972	aud, gym, cafet..........	$1,321	$1.24	73.2	10.9	4.9	11.0
Elementary school converted to junior high								
1	946	23 clrms incl 13 spec...... 6 shop rms; gym, cafet	....	$1.44	73.3	11.4	6.2	9.1
Vocational high school, new 2 & 3-story								
1	2330	aud, gym, cafet..........	$1,955	$1.43	68.9**	10.5	4.6	16.0

* excludes abnormal site costs and equipment ** Incl cost of elevators



NYC Housing Authority Data

Public Housing Contract Totals and Unit Prices

Awards by New York City Housing Authority

	4th Q '54	1st Half 1955							3rd Quarter 1955	
Project Number	(79)	(80)	(81)	(82)	(83)	(84)	(85)	(86)	(87)	(88)
Project	Forest II[e]	Wagner I[d]	Marlboro[e]	Albany II[e]	Washington II[d]	La Guardia II[d]	Jefferson II[d]	General Grant II[d]	Linden*	Carver II[e]
Total constr. rooms........No.	2,796	4,875	7,199	1,640	3,688	3,026	1,410	3,424	6,534	2,813
Total apartments...........No.	693	1,177	1,765	400	878	724	324	813	1,590	682
Rooms per apartm't.....Av. No.	4.03	4.14	4.08	4.10	4.20	4.18	4.35	4.21	4.11	4.12
Total cubage............Cu. ft.	5,976,800	9,230,654	15,183,887	3,249,689	6,988,161	5,852,789	2,934,540	7,912,226	14,333,039	5,493,215
Bid date.....................	10/26/54	2/15/55	3/1/55	3/8/55	3/22/55	6/1/55	6/8/55[a]	6/15/55	7/12/55	8/23/55
Cost per:										
Total contract...............	$5,915,737	$9,339,614	$15,813,926	$3,299,372	$6,614,429	$5,849,667	$3,241,317	$7,367,514	$15,733,397	$6,315,320
Constr. room...............	2,113.00	1,915,82	2,196.68	2,011,81	1,793.50	1,933.14	2,298.81	2,151.73	2,407.92	2,245.05
Apartment..................	8,536.00	7,935.00	8,959.73	8,248.43	7,533.52	8,079.65	10,004.06	9,062.31	9,895.22	9,260.00
Cubic foot..................	0.989	1.012	1.042	1.015	0.946	0.999	1.104	1.051	1.098	1.149
Fndns. and superstruct........	4,592,410	7,061,905	12,060,949	2,569,272	4,956,729	4,340,430	2,550,700	5,615,584	12,175,700	4,833,680
Constr. rooms..............	1,642.00	1,448.60	1,675.36	1,566.62	1,344.02	1,434.38	1,809.01	1,540.07	1,863.44	1,718.34
Apartment..................	6,627.00	5,999.92	6,833.40	6,423.17	5,645.48	5,995.06	7,872.53	6,907.24	7,657.67	7,087.51
Cubic foot..................	0.768	0.765	0.794	0.791	0.709	0.742	0.869	0.801	0.850	0.880
Heating and ventilation........	439,190[c]	775,895[c]	1,323,977	207,500	528,900[c]	487,150[c]	224,204[c]	523,264[c]	1,273,700[b]	453,000[c]
Constr. rooms..............	157.00	159.15	183.91	126.52	143.41	160.99	159.01	152.82	194.93	161.04
Apartment..................	634.00	659.21	750.13	518.75	602.39	672.86	691.99	643.62	801.07	664.22
Cubic foot..................	0.073	0.084	0.087	0.064	0.076	0.083	0.076	0.075	0.089	0.083
Electrical constr...............	347,837	596,590	1,088,000	202,350	450,800	375,890	178,800	486,612	986,000	408,740
Constr. rooms..............	124.00	122.37	151.13	123.38	122.23	124.22	126.81	142.12	150.90	145.30
Apartment..................	502.00	506.88	616.43	505.88	513.44	519.19	551.85	598.54	620.13	599.33
Cubic foot..................	0.058	0.065	0.073	0.062	0.064	0.064	0.061	0.069	0.069	0.074
Plumbing....................	536,300	905,224	1,341,000	320,250	678,000	646,197	287,613	742,054	1,297,997	619,900
Constr. rooms..............	192.00	185.69	186.28	195.27	183.84	213.55	203.98	216.72	198.65	220.37
Apartment..................	774.00	769.09	759.77	800.63	772.21	892.54	887.69	912.73	816.35	908.94
Cubic foot..................	0.090	0.098	0.088	0.099	0.097	0.110	0.098	0.106	0.091	0.113
Piling or abnorm. fndns........	160,000	550,000	2,308,000	78,000	1,100,000	295,710	20,196	510,862	793,000	850,000

* special standards Part 4, city aided program; without cash subsidy [a] bid date for contracts 7, 8, 9 & 10, 6/8 '55; date for contracts 5 & 6, 7/19/55 [b] incl total cost of boiler plant [c] incl proportionate cost of boiler plant cost [d] federally aided project [e] state aided project

Prices bid on housing projects let by the New York City Municipal Housing Authority increased sharply in June '55 and the rise continued during the third quarter. Top price paid by the Authority was $1.149 per cu ft on the contract for Carver II houses bid on August 23. This was 21% above the 1955 low of $0.946 per cu ft bid June 1 on the Washington II job and 10% above the top price paid in 1954.

Most of the 1955 rise came in foundations and superstructures which hit a high of $0.88 per cu ft on the August 23rd job. This was 24% above the low for the year of $0.79 per cut ft and compares with a top of $0.827 in 1954. The cost of mechanicals also trended up in '55. Electrical work ranged between $0.061 to $0.74 per cu ft compared with $0.043 to $0.060 in '54. Plumbing costs ran from $0.088 to $0.113 cu ft in '55 compared with $0.082 to $0.99 in '54. Heating and ventilation costs changed little at this range: $0.064 to $0.089.

On schedule . . . through the winter . . .

Christopher Columbus Houses, Newark, N. J., as of March, 1955.

Owner: HOUSING AUTHORITY, City of Newark, N.J.
Architect: WM. E. LEHMAN, Newark, N. J.
Contractor: TERMINAL CONSTRUCTION CORP., Wood Ridge, N. J.
Ready Mix Concrete: J. P. CALLAGHAN CO., Harrison, N. J.

. . . WITH LEHIGH EARLY STRENGTH CEMENT

Careful planning, good management and Lehigh Early Strength Cement kept construction on Newark's First Ward Housing Project moving at a steady pace through the winter of 1954-1955.

The quick curing concrete, made with Lehigh Early Strength Cement, enabled Terminal Construction Corporation to strip column forms in 24 hours, beam and arch forms in 48 hours. Curing time was cut by two-thirds. *And within 2½ working days after a pour, all forms were in place on the floor above, ready for the mechanical trades.*

Each day's pour—approximately 200 cubic yards—was completed before noon. With less bleeding and earlier hardening of the Early Strength concrete, finishers were off the job by 3:30 P.M. Overtime costs and unproductive overhead were cut to a minimum.

Remember Lehigh Early Strength Cement when planning winter concrete work. It will help you speed construction, cut costs.

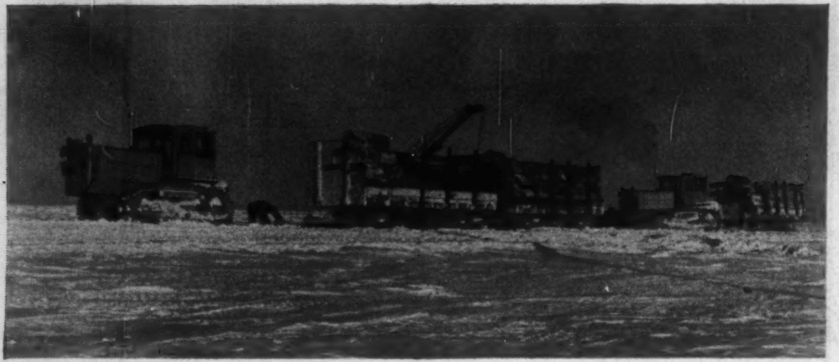
LEHIGH
HIGH EARLY STRENGTH
PORTLAND CEMENT

LEHIGH EARLY STRENGTH CEMENT
LEHIGH PORTLAND CEMENT
LEHIGH AIR-ENTRAINING CEMENTS
LEHIGH MORTAR CEMENT

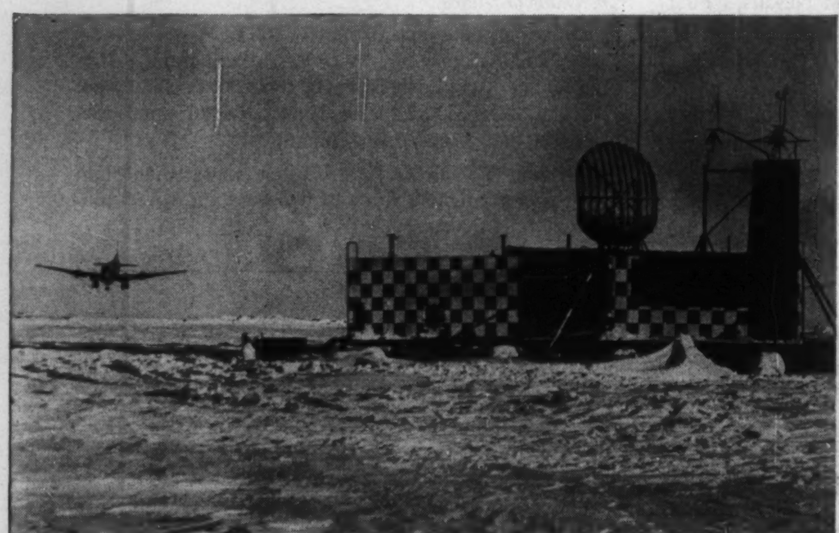
LEHIGH
PORTLAND CEMENT CO. *Allentown, Pa.*

REPORT ON BUILDING THE DEW LINE

On the rim of the world, construction men... using airlifts, Cat-powered tractor trains, and ingenuity... are buying the nation precious time against a sneak H-bomb attack



CAT TRAINS complete transportation of material from the United States to construction bases on the DEW line. D8s tow loaded sleds across ice to the final installation sites.



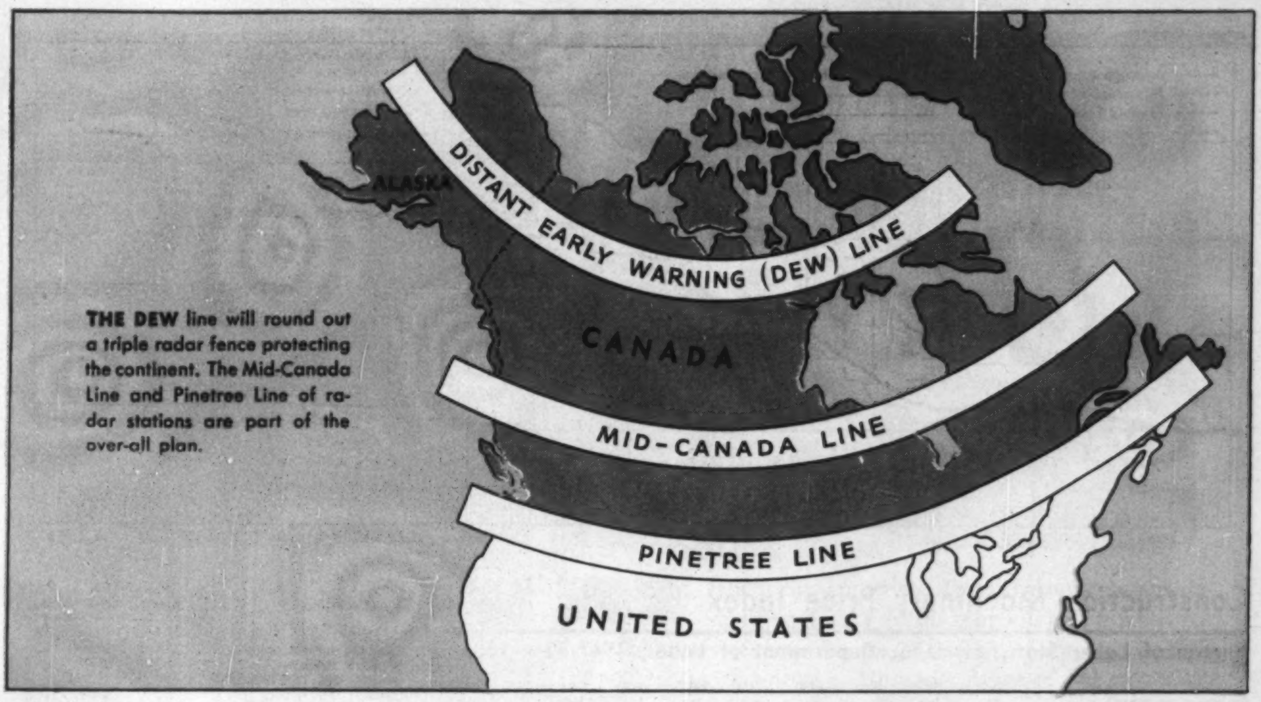
C-124 GLOBEMASTER, loaded with material for the Cat trains, approaches for a landing on a snow-covered landing strip. This strip was carved out by Caterpillar-built Bulldozers which cut snow down to bare ice.

Eighteen hundred miles north of Chicago, temperatures plunge to 70 below, blowing snow cuts visibility to zero, and sparse vegetation shatters like glass. Here construction men and machines are battling to carve out the world's greatest Arctic defense project —the Distant Early Warning (DEW) line, a joint U. S.-Canadian venture.

When finished they will have wrung from the Arctic wastes vital extra warning time against a sneak aerial attack. An uninterrupted line of radar stations will maintain a never-ending vigil.

Men and material began moving swiftly and silently inside the Arctic Circle early this year. Ice roads and complete camps were built where none existed a few weeks before. Men and machines had moved in by airlift and CAT*-powered tractor trains.

That was the end result of two years' research and study spearheaded by Western Electric, Bell Telephone System's manufacturing and supply unit. In February, Western Electric



THE DEW line will round out a triple radar fence protecting the continent. The Mid-Canada Line and Pinetree Line of radar stations are part of the over-all plan.

was named prime contractor for the DEW line construction. Subcontractors include Puget Sound Bridge and Dredging Company and Johnson, Drake and Piper, Inc., both of Seattle; the Northern Construction Company and J. W. Stewart, Ltd., of Vancouver; and Foundation Company of Canada, Ltd., of Montreal.

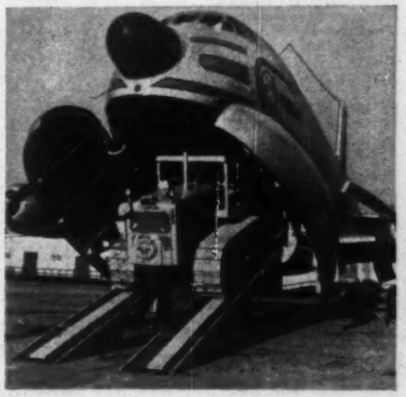
Backbone of each of the spreads is Caterpillar* Arctic-proof equipment. It has proved itself building Thule Air Base in Greenland. It has hauled supplies for the Naval Petroleum Exploration Program at Point Barrow. For decades it has served the commercial needs of industry of the north in mining, construction, pulp and similar operations.

To get the job done it was natural for DEW line subcontractors to rely on their fleets of D4s, D6s, D8s, No. 12 Motor Graders, Traxcavators*, Cat Scrapers and Electric Sets.

Cat trains moved above the Arctic Circle making landing strips and blazing new snow roads through the meager stands of hoar-frosted vegetation which reacted like glass when snapped by bulldozers. Other Cat units followed, flown into the landing strips in the Air Force's big airlift, "Operation Big Haul."

Altogether 6600 tons of tractors, buildings and other heavy equipment were brought in by the Tactical Air Command's 18th Air Force. At the airstrips, construction crews put together hundreds of small prefabricated buildings and bolted them to rounded timbers which served as sled runners. Trains of them were towed by Caterpillar track-type Tractors to various Arctic sites.

All big yellow machines have been winterized to withstand temperatures as low as 70 below. The foresight has paid off. On February 15, nine D8s, all equipped with Caterpillar's new oil clutches, were at a point where the mercury dropped to an all-time low of 76 below! *No trouble was reported!*



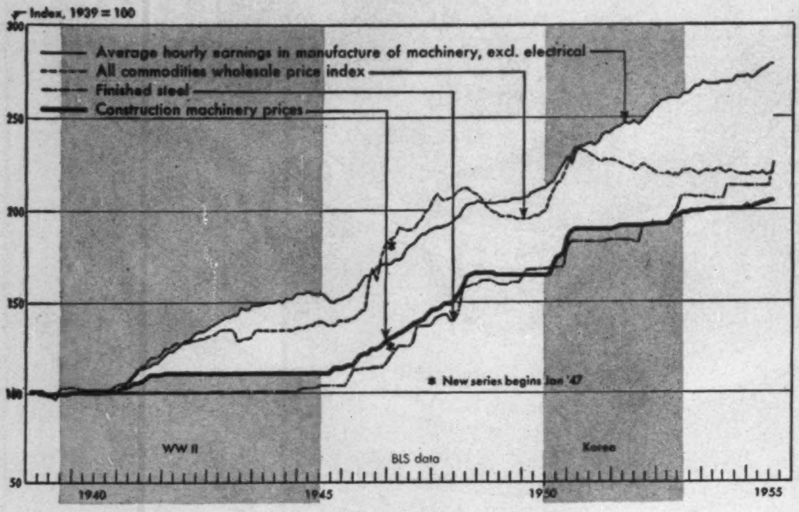
A D8 is pulled aboard a Globemaster as part of the DEW line airlift at an Alaskan base. Tractors made up a good part of the 6600 tons of cargo which the Air Force flew to advance bases.

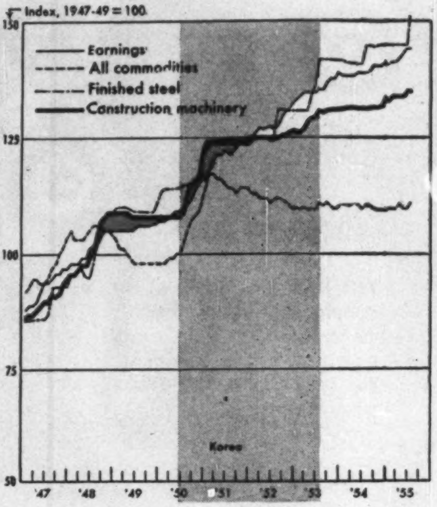
A few refinements have been added, such as escape hatches for operators of tractors in the event they drop through the ice.

Today, north of the Arctic Circle, the painstaking research which goes into all Caterpillar equipment is paying off. For on this vital project . . . on this toughest of all proving grounds . . . only the most dependable equipment can be trusted. Once again the choice has been Caterpillar.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS, U. S. A.

*Cat, Caterpillar and Traxcavator are registered trademarks—®





Construction Machinery Price Index

Bureau of Labor Statistics, U. S. Department of Labor, 1947-49 = 100

By type of equipment	1947 Jan.	1948 Jan.	1949 Jan.	1950 Jan.	1951 Jan.	1952 Jan.	1953 Jan.	1954 Jan.	1955 Jan.	1955 July
Constr machy & equip, all types...	86.3	95.8	108.7	108.0	123.1	124.6	126.2	131.2	133.2	134.7
Power cranes, etc.	87.7	95.4	108.3	106.9	123.3	123.6	124.2	129.9	133.8	135.7
Machinery, tractor mounted	83.2	93.8	108.9	109.7	122.9	127.5	131.3	133.2	134.5	134.8
Specialized constr machinery	84.2	100.7	106.5	106.1	119.3	119.5	119.3	124.3	122.8	123.4
Portable air compressors	93.6	98.0	105.4	105.4	124.8	124.8	124.8	124.8	132.0	133.6
Scrapers and graders	85.9	95.9	110.0	108.4	127.3	128.6	129.6	129.4	129.4	130.1
Air tools, hand tools	89.6	97.5	106.0	106.8	120.5	120.5	120.5	125.0	125.0	125.0
Mixers, pavers, etc	89.3	95.6	107.7	105.9	117.9	118.5	117.7	122.9	122.7	126.7
Tractors, non-farm	84.1	95.0	110.1	110.3	123.9	126.6	131.1	139.5	141.6	142.9

All types by year and month

	1947	1948	1949	1950	1952	1953	1954	1955
Av.	90.0	101.8	108.3	111.5	125.5	129.3	131.6	.....
Jan.	86.3	95.8	108.7	108.0	124.6	126.2	131.2	133.2
Feb.	86.9	95.4	108.7	108.0	125.2	126.2	131.5	133.8
Mar.	87.0	97.3	108.6	108.0	125.2	127.1	131.7	133.8
April	87.5	97.5	108.5	108.0	124.9	128.6	131.6	134.1
May	88.5	97.6	108.3	108.2	125.5	129.1	131.5	134.3
June	89.5	99.5	108.3	108.1	125.4	129.4	131.5	134.7
July	90.3	101.4	108.3	108.8	125.4	130.8	131.5	134.7
Aug.	90.9	104.1	108.1	112.6	125.3	130.5	131.5	.....
Sept.	91.4	106.7	108.1	114.6	125.8	130.9	131.6	.....
Oct.	92.3	106.0	108.1	115.6	125.8	131.0	131.6	.....
Nov.	93.7	108.6	108.0	116.2	126.2	131.1	131.8	.....
Dec.	94.7	108.7	108.1	121.7	126.3	131.1	132.6	.....

Construction Equipment Cost Index, 1926 = 100

By Marshall & Stevens, Chicago

1913	63.0	1924	107.2	1935	79.7	1946	124.2
1914	59.2	1925	105.4	1936	83.0	1947	150.3
1915	61.2	1926	100.0	1937	87.2	1948	161.1
1916	67.5	1927	95.9	1938	82.9	1949	161.1
1917	88.2	1928	96.8	1939	82.4	1950	166.2
1918	122.6	1929	91.0	1940	83.4	1951	177.3
1919	129.0	1930	86.1	1941	92.0	1952	177.8
1920	154.4	1931	77.6	1942	100.8	1953	179.6
1921	119.7	1932	71.9	1943	101.3	1954	183.0
1922	83.5	1933	71.8	1944	101.6	6/55	185.8
1923	97.3	1934	76.0	1945	102.5	....	.....

Construction Equipment Rental Rates

Associated Equipment Distributors, Chicago, Ill.

All rates are fob lessor's warehouse or shipping point. Lessee pays transportation costs to destination and return. Rates do not include operator, fuel or oil. Lessor bears cost of repairs due to normal wear and tear on non-tractor equipment, the lessee bears all other costs. For tractor and rubber-tired hauling equipment, the lessee bears all costs for maintenance and repair. Rates are based on one shift of 8 hours per day, 40 hours per week, 175 hours per month of a 30 consecutive day period. Overtime is prorated on a per-hour basis. Equipment is delivered to lessee in good operating condition and returned in as good condition less normal wear. Excessive cleaning or repairs may be charged to lessee. Rental rates start when equipment leaves lessor's delivery point. All rents are payable in advance. No insurance, license, sales or use taxes are included in these rates.

EQUIPMENT RENTAL RATES vary greatly throughout the United States, depending upon local practices and conditions. A compilation of prevailing rental rates (representing as nearly as could be determined an over-all average of rental rates throughout the United States for specified types of equipment) has been made for informational purposes only by the Associated Equipment Distributors, 30 East Cedar St., Chicago, Ill., and is available at $5 per copy. Selected items from the Seventh Edition published in 1955 are reported here.

Type of equipment	Per month	Per week	Per day
Air compressors, portable:			
Gas, 85–125 cf, 100 psi	$198.00	$65.50	$20.00
Gas, 125–185 cf, 100 psi	246.00	82.25	25.25
Gas, 185–250 cf, 100 psi	337.00	111.00	33.25
Gas, 250–365 cf, 100 psi	455.00	149.50	45.25
Diesel, 185–250 cf, 100 psi	422.00	139.75	43.50
Diesel, 250–365 cf, 100 psi	542.00	177.00	56.00
Diesel, 365–600 cf, 100 psi	861.00	286.00	90.25
Air tools:			
Clay spades, incl. scoop	33.75	12.50	3.85
Drifters, medium	84.00	27.75	8.70
Hoists, 1501–2500 lb singl dr	86.25	28.50	9.15
Hoists, 2501–3500 lb singl dr	107.00	35.75	11.75
Hose, ¾ in, per 50 ft length	8.35	3.65	1.60
Pavement breakers, 1–69 lb	42.75	15.00	4.65
Pavement breakers, 70–95 lb	46.75	16.25	5.10
Rotating rock drill, 1–50 lb	42.75	15.00	4.65
Rotating rock drill, 51–68 lb	47.00	16.25	5.25
Rotating rock drill, 69–80 lb	52.50	17.75	5.65
Tampers, single	33.00	12.25	3.85
Vibrators, pneu pwr flexible, 20–35 lb	58.00	19.00	6.10
35–50 lb	64.50	21.25	7.15
Wagon drill, with air hoist, medium	219.00	70.50	23.00
heavy	248.00	81.25	27.25
Boilers: Vertical, 20–25 hp	145.00	.....	.....
Vertical, 50–60 hp	232.00	.....	.....
Horizontal, 55–70 hp	264.00	.....	.....
Horizontal, 90–125 hp	388.00	.....	.....
Buckets: Clamshell, ⅜ cy	94.00	31.00	10.25
Clamshell, ¾ cy	134.00	44.75	14.50
Clamshell, 1½ cy	204.00	67.00	21.75
Concrete, bottom dump, 1 cy	56.50	19.50	6.85
Concrete, bottom dump, 2 cy	92.50	28.75	9.85
Dragline, 1 cy	116.00	38.75	13.25
Dragline, 1½ cy	148.00	48.75	15.50
Dragline, 2 cy	177.00	58.00	18.75
Bulldozers—see tractors			
Concrete carts, power driven:			
Manually guided	82.25	29.75	8.95
Carriers operator	121.00	41.00	12.25
Cranes, cap at ft radius:			
Crawler, gas 5-6⅛ ton, 10'	681.00	214.00	71.25
7⅜–8¾ ton at 12'	886.00	287.00	95.75
24½–33½ ton at 12'	1,612.00	520.00	171.00
Crawler, diesel			
5–6½ ton at 10'	760.00	238.00	78.75
7⅜–8¾ ton at 12'	972.00	311.00	104.00
24½–33½ ton at 12'	1,915.00	615.00	200.00
Truck mounted, gas			
5–7 ton 10'	913.00	285.00	90.00
17½–20 ton at 10'	2,165.00	698.00	210.00
30–35 ton at 10'	3,898.00	1,364.00	452.00
Dragline excavators:			
Crawler mounted, gas ¾ cy	1,087.00	351.00	111.00
Crawler mounted, gas 1½ cy	1,906.00	605.00	196.00
Crawler mounted diesel ¾ cy	1,216.00	392.00	127.00
Crawler mounted, diesel 1½ cy	2,207.00	702.00	233.00
Truck mounted, gas ¾ cy	2,175.00	672.00	211.00
Truck mounted, diesel ¾ cy	2,319.00	722.00	221.00
Engines:			
Diesel, with clutch 70–90 hp	328.00	103.00	35.75
Diesel, clutch, 115–140 hp	480.00	147.00	53.50
Diesel, clutch, 165–185 hp	813.00	272.00	91.50
Finishing machines:			
Bituminous machines, crawler, self-powered, diesel	1,638.00	579.00	148.00
Conc floor, powered, 30–36" d.	87.00	29.50	9.50
Conc highway finisher, 10–15'	837.00	263.00	79.00
Pile hammers:			
McKiernan-Terry #S-3	312.00	103.00	.....
McKiernan-Terry dbl-actg #1	80.50	26.00	9.95
dbl actg 9B 2 or 3	328.00	106.00	35.00
Vulcan, single acting #1	415.00	135.00	.....
Vulcan, double acting, #50C	502.00	.....	.....

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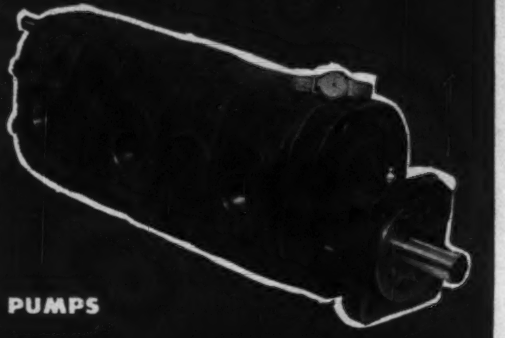
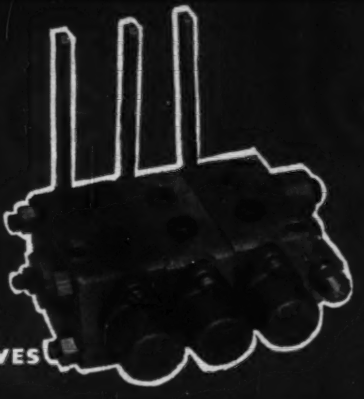
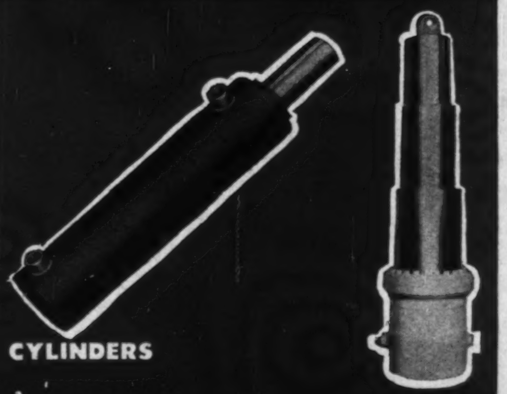


PUMPS



VALVES



CYLINDERS

MOTORS

YOU'RE PAYING FOR AN OIL HYDRAULIC SYSTEM- WHY NOT GET IT?

"Commercial" Fluid Power Controls Keep Construction Equipment On The Go

Heavy duty constant delivery hydraulic pumps developing from 2 to 100 gpm will give trouble-free dependable service even though operating pressures go as high as 1500 psi—with side or end porting, flange or pad mounting, splined or round shafts, split flange on threaded connections. More than one pump, each independent of each other, can be mounted on a common shaft in a unit.

Finger tip directional control valves with positive hold in each action have non-restricted capacity up to 35 gpm to pressure up to 2000 psi. Control from any combination of manifolds having single action, double action or double action with float can be assembled into a multiple unit. Solid spool construction with either spring return or poppet detents are standard.

For powered in-line motion in the hydraulic system you can depend on these slim silhouette heavy duty single acting and double acting cylinders. Standard in many styles of plunger fittings and cylinder mountings. They are available with stroke up to 45 inches and capacities up to 25 tons—working pressure up to 1500 psi. Multiple sleeve telescopic cylinders with stroke up to 84 inches have low shut height.

Rotary motion applications in the hydraulic system perform better when powered by "Commercial" rugged heavy duty constant delivery motors which convert fluid power at pressures up to 1500 psi into mechanical power up to 35 hp. Features of the "Commercial" pump are likewise common to these motors. More and more applications are now practical because of "Commercial's" new fluid motor.

THE COMMERCIAL SHEARING AND STAMPING COMPANY
YOUNGSTOWN 1, OHIO · CHICAGO, ILLINOIS · SALT LAKE CITY, UTAH

COMMERCIAL
shearing and stamping

Products Preferred by Customer Acceptance

Equipment Rental Rates—AED

Continued from preceding page

Type of equipment	Per month	Per week	Per day
Hoists:			
Air, 1500–2500 lb single dr	$86.25	$28.50	$9.15
Air, 2500–3500 lb single dr	107.00	35.75	11.75
Chain, up to 1½ ton	20.00	6.80	2.15
Chain, 2½ to 4 ton	33.25	12.25	4.15
Gas, single drum, 14–22 hp	81.00	27.00	8.60
Gas, single drum, 29–42 hp	129.00	43.25	14.75
Gas, double drum, up to 22 hp	106.00	36.75	11.25
Gas, double drum, 28–45 hp	158.00	55.00	17.00
Elec. single drum, 17–27 hp	94.25	30.50	.....
Elec. double drum, 17–27 hp	121.00	38.00	.....
Elec, three drum, 47–57 hp	275.00	90.50	.....
Mixers, concrete:			
Tilting dr, low charg 0–3½ cf	60.75	21.25	6.95
Non-tilting drum,			
low charger 3½–6½ cf	81.25	28.00	9.00
power charger, 3½–6½ cf	165.00	54.75	13.75
power charger, 10½–12 cf	182.00	64.25	21.50
Paver, #34-E, single drum	2,308.00	727.00	.....
Pumpcrete, conc pump, remix:			
Gas, Mod. 160 single cyl	776.00	264.00	.....
Gas, Mod. 200 double cyl	1,982.00	645.00	.....
Elec, Mod. 160 single cyl	858.00	281.00	.....
Elec, Mod. 200 double cyl	2,155.00	696.00	.....
Pumps:			
Centrifugal, gas 2" 7–10M	55.75	19.25	6.20
Centrifugal, gas 3" 15–20M	70.25	24.25	7.85
Centrifugal, gas 4" 30–40M	107.00	36.50	11.75
Centrifugal, diesel 6" 90M	258.00	83.25	26.50
Diaphragm, force or open,			
3" single	58.00	20.75	6.60
4" single	67.75	22.50	7.50
Rollers:			
2-wheel tandem, 3½–5 ton gas	302.00	98.00	29.25
2-wheel tandem, 12–15 ton gas	552.00	175.00	56.00
3-wheel, 7½–9 ton gas	438.00	140.00	45.75
2-wheel tand, 5–8½ ton diesel.	475.00	152.00	47.00
3-wheel, 7½–9 ton diesel	494.00	159.00	52.50
Steam, compaction, towed			
4 wheels front, 5 rear	148.00	50.50	15.00
6 wheels front, 7 rear	167.00	57.25	17.75
Steam, compaction self-propel			
4 wheels front, 5 rear	456.00	156.50	49.50
Shovels & backhoes, dipper incl:			
Crawler, gas ¾ cy	1,176.00	365.00	114.00
Crawler, gas 1½ cy	2,012.00	638.00	214.00
Crawler, gas 2½ cy	3,299.00	1,101.00	362.00
Crawler, diesel ¾ cy	1,275.00	413.00	135.00
Crawler, diesel 1½ cy	2,271.00	734.00	243.00
Crawler, diesel 2½ cy	3,961.00	1,313.00	429.00
Backhoes, crawler, gas ¾ cy	1,145.00	359.00	117.00
Backhoes, crawler gas 1½ cy	2,011.00	629.00	211.00
Backhoes, crawler diesel ¾ cy	1,286.00	414.00	136.00
Backhoes, crawler diesel 1½ cy	2,436.00	802.00	277.00
Backhoes, truck, gas ½ cy	1,382.00	378.00	122.00
Backhoes, truck, diesel ½ cy	1,612.00	516.00	159.00
Shovel attachments:			
Shovel front, ⅜ cy	183.00	76.00	26.00
Shovel front, ½ cy	256.00	86.00	28.50
Shovel front, ¾ cy	394.00	131.00	43.50
Hoe attachment, ⅜ cy	184.00	75.00	25.00
Hoe attachment, ½ cy	285.00	93.25	31.50
Hoe attachment, ¾ cy	360.00	134.00	45.00
Trenching machines:			
Ladder type, gas 8½', 36"	1,169.00	404.00	128.00
Ladder type, diesel 8½', 36"	1,329.00	452.00	157.00
Wheel type, gas 5–6', 24"	931.00	305.00	105.00
Wheel type, diesel 5–6', 24"	1.005.00	342.00	120.00
Vibrators:			
Electric, 18 ft shafting			
⅜–⅝ hp	52.00	18.00	6.55
⅝–1¾ hp	62.50	22.00	7.20
1¾–2¾ hp	68.75	23.50	7.75
Elec, 180-cycle, gen & 1 vibr	150.00	49.00	16.00
Gas, 21 ft shafting up to 1½ hp	67.50	23.25	7.65
Gas, 28 ft shafting 2½–3½ hp.	87.75	29.25	9.75
Gas, 28 ft shafting 3½–4½ hp.	91.75	30.50	10.25
Welding machines:			
Gas eng driven, to 250 amp	94.50	31.75	9.50
Gas eng driven, 250–350 amp.	128.00	42.00	12.75
Gas eng driven, 350–500 amp.	149.00	50.00	17.75
Tractors, diesel crawler: hp†			
AC Mod. HD5, 1955 40	553.00	181.00	59.50
AC Mod. HD9, 1955 72	968.00	327.00	105.00
AC Mod. H 16, 1955 116	1,419.00	473.00	159.00
AC Mod. HD 16-C, 1955, tc...	1,574.00	531.00	172.00
AC Mod. HD21, 1955 204	1,983.00	645.00	202.00
Cat. Mod. D2, 1955 38	478.00	158.00	48.50
Cat Mod. D4, 1955 48	627.00	189.00	61.50
Cat Mod. D6, 1955 75	930.00	296.00	93.50
Cat Mod. D7, 1955 102	1,198.00	385.00	115.00
Cat Mod. D8 (DD), 1955 ..155	1,811.00	535.00	179.00
Cat Mod. D8, 1955, tc ....191#	1,957.00	650.00	209.00
Cat Mod. D9 (DD), 1955 ..236	2,701.00	886.00	308.00
Cat Mod. D9, 1955, tc ....286#	3,027.00	1,031.00	368.00
IH Mod. T6, 1955 33	316.00	108.00	36.25
IH Mod. T9, 1955 43	420.00	143.00	48.25
IH Mod. TD6, 1955 34	451.00	150.00	44.50

Type of equipment	Per month	Per week	Per day
Tractors, diesel crawler—continued			
IH Mod. TD9, 1955 41	$555.00	$180.00	$56.50
IH Mod. TD 14A, 1955 66	791.00	260.00	81.00
IH Mod. TD 18A, 1955 89	1,001.00	334.00	110.00
IH Mod. TD24, 1955 161	1,612.00	543.00	183.00
IH Mod. TD24, 1955 tc ...200*	1,844.00	628.00	222.00
Oliver Mod. OC-3, 1955 22	296.00	96.00	29.00
Oliver Mod. AG-6, 1955 31	348.00	103.00	38.00
Oliver Mod. AD, 1955 31	375.00	122.00	42.00
Oliver Mod. OC-12, 1955 ...45	542.00	175.00	59.00
Oliver Mod. DD, 1955 61	664.00	219.00	70.00
Oliver Mod. OC-18, 1955 ..133	1,257.00	408.00	126.00
Bulldozers, for tractor of:			
Up to 42 hp (drawbar)	146.00	48.00	16.25
66–89 hp	224.00	71.50	23.75
135–150 hp	327.00	107.00	35.25
Tractor loaders:			
Crawler mounted. 1–1½ cy	828.00	267.00	79.75
Rubber mounted diesel,			
2-whl drive ¾–1 cy	605.00	192.00	62.75
4-whl drive 1¼–1½ cy	1,097.00	360.00	126.00
Rubber mounted gas.,			
2-whl drive ⅝–¾ cy	500.00	166.00	51.75
4-whl drive 1–1¼ cy	801.00	285.00	94.50

*† drawbar hp *# hp at flywheel

*tc torque converter drive

Type of equipment	Per month	Per week	Per day
Tractors with cable scrapers:			
2-wheel tractor with 2-wheel cable scraper (heaped mass)			
6½ to 8 cy	$1,457.00	$486.00	$158.00
11½ to 14 cy	2,223.00	766.00	244.00
17 to 19 cy	2,477.00	753.00	248.00
17 to 20 cy	2,963.00	945.00	305.00
4-wheel tractor with scraper:			
8½ to 15½ cy	1,488.00	440.00	129.00
11½ to 15 cy	1,490.00	465.00	111.00
11 to 14 cy	2,415.00	.....	.....
17½ to 23 cy	2,764.00	917.00	280.00
Graders:			
Diesel, up to 16,500 lb	583.00	187.00	57.00
Diesel, 16,501–22,000 lb	797.00	261.00	81.00
Diesel, 22,001–24,000 lb	947.00	315.00	96.00
Diesel, over 24.000 lb	1,032.00	326.00	103.00
Rollers, sheepsfoot, double dr:			
42" diam, 48" length	160.00	57.50	16.75
60" diam, 60" length	374.00	130.00	41.50
Rooters:			
Heavy, 7,001–11,000 lb	248.00	77.50	23.75
Scrapers, without power units:			
Heaped mass 7–10 cy	459.00	147.00	48.00
Heaped mass 13½–17 cy	715.00	226.00	70.00
Heaped mass 17–22 cy	944.00	311.00	99.00

** torque converter drive—hp figures represent net engine hp

Equipment Rental Rates +15%

California Department of Public Works, Division of Highways

Operators not included. Rates do include cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance, depreciation, storage, insurance and all incidentals. Rental time to be paid for is time equipment is in operation on force account work plus time necessary to move equipment to work and return it to its original location. State pays transportation, loading and unloading charges.

These rates plus 15% are paid except that in no case shall the rates paid exceed those of established distributors or equipment rental agencies.

Type of equipment

Air compressors, self-contained power unit, portable, single" & 2-stage, water or air cooled, gasoline or Diesel engine· Rates incl pipe, 50 lin ft of hose, hose whips, fittings and couplings, with or without idler, unloader, hour meter, automatic oiler and starter)

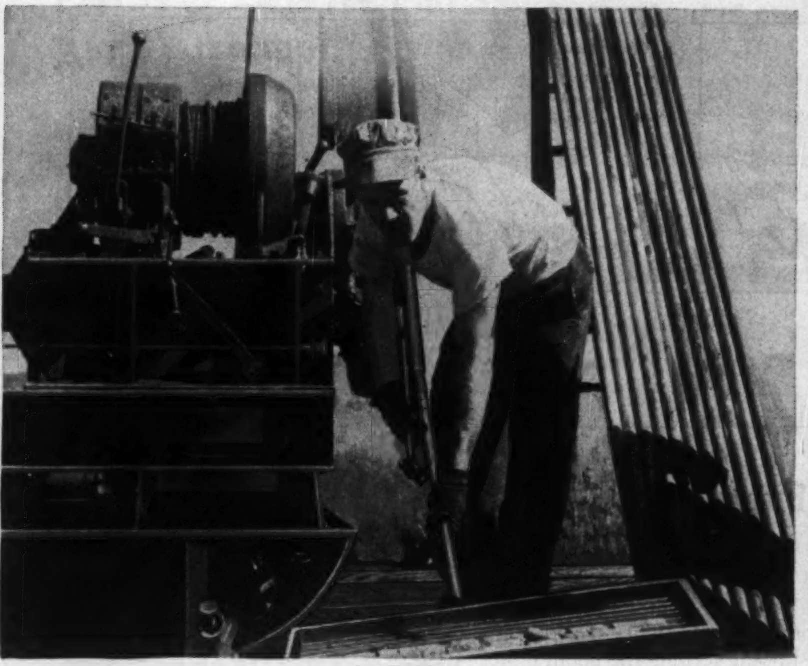
Capacity, cf/m	Rate/hr	Capacity, cf/m	Rate/hr
0 to 65 incl	$1.80	210 to 315 incl	$4.40
65 to 85 incl	2.00	315 to 365 incl	5.00
85 to 105 incl	2.15	365 to 425 incl	5.20
105 to 160 incl	2.65	425 to 500 incl	5.55
160 to 210 incl	3.30	500 to 600 incl	6.50

Additional air hose, per 50-ft of hose............ 0.20
Air tools, chippers, trench diggers, spaders, jack hammers, paving breakers, tampers, grinders, sheeting drivers........................ea 0.35
Wagon drills, with air hoist.....................ea 1.00
Drill steel, set of 1–5 pcs, with rose point bits or threaded with jackbits....................set 0.60
Drill steel and Moil Point sharpening charge......ea 0.35
Concrete mixers, incl measuring tank, batchmeter and pumps when required, 4½ cf and smaller..... 0.90
4½ cf to 6 cf incl $1.00 8½ cf to 12 incl.... 1.60
6 cf to 8½ cf incl 1.15 12 cf to 16 incl.... 2.25
Distributors, bituminous, pressure, incl pump & spray bar
up to 800 gal...... $5.00 1401 to 1800 gal..... 7.00
801 to 1400 gal.... 6.00
Light plants, portable, incl wiring and lights. Gasoline or Diesel engine, AC or DC. . up to 1,000 watts.... 0.40
1,100 to 1,750 watts $0.50 4,500 to 6,000 watts. 1.25
1,750 to 2,900 watts 0.60 6,000 to 9,000 watts. 1.35
2,900 to 4,500 watts 0.85 9,000 to 12,000...... 1.50
Lanterns, bombs or torches, incl fuel filling & servic.. 0.50
Pumps, centrifugal, portable incl power hoses, suction & discharge, foot valve & fittings, self priming
1½" 3 Mg/hr....$0.70 4" 30–40 Mg/hr.... 1.95
2" 7–10 Mg/hr... 0.95 6" 70–90 Mg/hr.... 2.70
3" 15–20 Mg/hr.. 1.40 8" 125 Mg/hr.... 3.50
Loaders, crawler tractor type, incl tractor with attachments, front end or overhead, 20–33 hp, ½ cy..... 4.10
34–43 hp, ½–¾cy. $4.80 65–85 hp, 2–3½ cy... 10.20
34–43 hp, 1⅛ cy... 6.40 86–135 hp, 2.7–9 cy.. 13.60
Loaders, front end wheel type, incl tractor with attachments, gasoline or Diesel engine, ⅛ cy........... 3.25
⅜ cy bucket...... $3.50 1 cy bucket....... 4.75
½ cy.............. 3.90 1¼ cy............. 5.25
¾ cy.............. 4.30 1½ cy............. 6.25
Motor graders, Diesel & gasoline, single or tandem drive, all wheel & all steer, 0–13,998#, 30–50 hp... 4.10
13,999–19,700#, 40 plus hp..................... 5.25
19,701# plus, 60 hp plus....................... 6.00
Rollers, road, gasoline & Diesel, 3-wheel, 2-wheel tandem, 3-wheel tandem, 5–7.9 tons loaded....... 2.70
8–9.9 tons loaded..$3.30 12 tons loaded & up.. 4.50
10–11.9 tons loaded 3.75 (Mfrs rated capacity)
Rollers, rubber-tired, incl wobble-wheel
2–9 wheel, 9 tons loaded...................... 1.00
9–13 wheel, 13 tons loaded.................... 1.50
Rollers, tamping & grid, single drum.............. 0.60
double drum...... $0.85 Triple drum........ 1.00
Rooters, rippers & scarifiers
Light, 3,500 lb & under $1.00 Heavy, 7,001–11,000. 1.75
Med, 3,501–7,000 lb.. 1.50 Xtra hvy 11,001 up.. 2.00

Type of equipment — **Rate/hr**

Scrapers, without power units, 0–3¾ cy............$1.70
3¾–5 cy.......... $1.80 13½–16 cy.......... 3.75
5–7½ cy.......... 2.60 16–20 ½ cy......... 5.10
7½–10 cy......... 2.75 20½–27 y........... 5.50
10–13½ cy........ 3.75 (struck measure)
Shovel, power-crawler, gasoline or Diesel, as shovel, backhoe, dragline, clamshell, pile driver, crane complete with bucket and boom factory length and attachments (capacity when used as power shovel)
⅜ cy...$5.35 1 cy...$9.25 2 cy... 16.50
½ cy... 6.00 1¼ cy...11.00 2¼ cy... 17.50
⅝ cy... 7.00 1½ cy... 12.50 2½ cy... 19.00
¾ cy... 8.00 1¾ cy... 15.00 3 cy... 24.00
Shovel, truck mounted, as shovel, backhoe or dragline, ¼ cy (capacity as power shovel)............ 4.75
⅜ cy............ $6.50 ¾ cy.............. 9.75
½ cy............ 7.25 1 cy.............. 10.50
Shovel, truck mounted, as crane, clamshell, pavement breaker or pile driver, complete with boom & bucket
5,000– 9,500#,10'rad $4.00 18,000–24,000#, 10'.. 8.75
9,500–14,000#,10'rad 6.00 24,000–29,000#, 10'.. 10.00
14,000–18,000#,10'rad 6.75 29,000–40,000#, 10'.. 11.00
Tractor accessories, angle, bulldozers, U-dozers and backfiller attachments, for crawler tractor
up to 42 hp....... $0.60 90–135 hp.......... 0.80
43–66 hp.......... 0.65 136 hp up.......... 1.05
67–89 hp.......... 0.75 (drawbar horsepower)
Power control unit, either hydraulic or cable
Single drum, 1 or 2 valve..................... 0.45
Double drum, 3 valve.......................... 0.70
Tractor wagons, 8–9 cy struck... $2.75 17 cy.... 3.25
Tractors, crawler, Diesel and gasoline
AG, AD.D2, TD6, T6, OC, HG, 20–33 hp, drawbar. 3.00
BD, BG, HD5, TD9, T9 34–41 hp......... 3.25
D4.................... 42–46 hp......... 3.75
47–52 hp......... 4.25
TD14, HD7, DD, DG, TD14A. 53–62 hp......... 4.75
D6, HD9............... 63–72 hp......... 5.35
D7, TD18, HD10, TD18A..... 73–89 hp......... 6.00
D8, FDE, HD14, HD15, FD, FDLC, OC18, 90–135 hp 7.25
HD20, TD24, D8 Super...... 136–165 hp....... 9.20
Tractors, 4-wheel, rubber tired gasoline or Diesel
16–24 hp......... $2.35 90–103 hp......... 6.25
25–35 hp......... 2.50 104–115 hp........ 7.50
36–46 hp......... 2.50 225 hp............ 11.00
Tractors, 2-wheel, rubber tired with scraper, gasoline Diesel or butane, incl power control units
80–100 hp, 6–10 cy struck..................... 9.25
101–145 hp, 13–17 cy struck................... 10.25
146–160 hp, 10–14 cy struck................... 11.00
161–200 hp, 13–17 cy struck................... 12.50
Trucks, pickup, flat rack, stake body or tractor truck
Passenger car or station wagon................ 1.10
Pickup, ½-ton................................. 1.10
¾ ton... $1.25 3 ton...$3.00 5 ton...... 4.25
1 ton... 1.50 3½ ton... 3.30 6– 9 ton... 5.00
1½ ton... 1.75 4 ton... 3.60 10–14 ton... 5.50
2 ton... 2.25 4½ ton... 3.80 15–18 ton... 6.50
2½ ton... 260 (Manufacturer's capacity)
Power winch, add.............................. 0.65
Front wheel drive on 1½-ton or more, add....... 0.35
Tandem axle drive, add........................ 0.35
Water trucks, add............................. 0.20

Continued on page 319



FOUNDATION EXPLORATION

The Delaware Memorial Bridge, Pennsylvania Turnpike, New York State Thruway, Garden State Parkway, Florida Turnpike, Maine Turnpike, and the St. Lawrence River Waterway Project, are only a few of the important engineering achievements for which we have been privileged, in recent years, to make some, or all, of the foundation test borings.

For more than seventy years we have been leaders in the field of Core Drilling, Soil Sampling and other types of testing for the foundations of Bridges, Dams, Highways, Airports and large Buildings of every kind. Besides exploratory drilling, our service includes grout-hole drilling and pressure grouting. Today, we have a large force of expert operators and an ample supply of modern equipment that can be applied to practically any job, anywhere, on short notice.

Inquiries for all types of contract drilling work are solicited — estimates submitted promptly, without charge or obligation.

SPRAGUE & HENWOOD INC., Scranton 2, Pa.

NEW YORK • PHILADELPHIA • PITTSBURGH • GRAND JUNCTION, COL. • BUCHANS, NFLD.
EXPORT REPRESENTATIVE, PHILLIPS EXPORT CO., 100 EAST 42nd STREET, NEW YORK, N.Y.

NEW LIGHT-WEIGHT HIGH-SPEED CORE DRILLING MACHINES

Designed to meet the demand for compact units, which can be moved easily from one location to another, these new machines can also be relied upon to produce good smooth cores rapidly, at minimum expense.

A racking arrangement moves the drilling unit forward or backward, while driving casing or pulling rods, without changing the position of the sheavewheel on the derrick, with relation to the drill hole. Standard single-pole derrick permits pulling rods or casing up to 10-ft. lengths. All models can be powered by either gasoline or diesel engines, air or liquid cooled, with 3-speed transmissions.

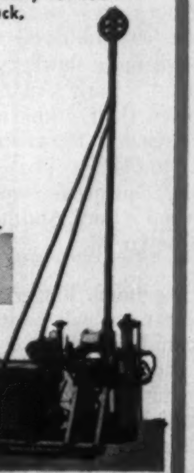
Modern simplified design includes convenient controls, machine-cut alloy-steel gears, anti-friction bearings and other improved features to assure low-cost trouble-free operation. Write for illustrated leaflets containing complete descriptions and working data.

TRUCK MOUNTED

Complete drilling rigs, mounted on 4-wheel-drive trucks with capacity for carrying accessory equipment and supplies.

TRAILER MOUNTED

for easy portability without tying up a truck.



SKID MOUNTED

for jobs not easily accessible by truck or trailer. Wide structural-steel base and low center of gravity provide ample stability.

Leading Manufacturers of High-Speed Diamond Core Drilling Machines, "Oriented" Diamond Bits and a complete line of Improved Accessory Equipment for Core Drilling and Soil Sampling. Write for illustrated catalogues containing complete specifications and all necessary working data on:

Auger Bits, all types
Bails, lifting
Ball-Bearing Waterswivels
Bits, Diamond
Bits, Blank
Bits, Chopping
Bushings, Rod & Casing
Casing, Flush Coupled
Casing Taps
Clinometers
Corebarrels, all types
Corebarrel Taps
Core Lifters
Couplings, Rod
Derrick Sheaves
Drill Rods
Drilling Machines
Drive Hammers
Drive Heads
Drive Pipe
Drive Pipe Couplings
Drive Shoes
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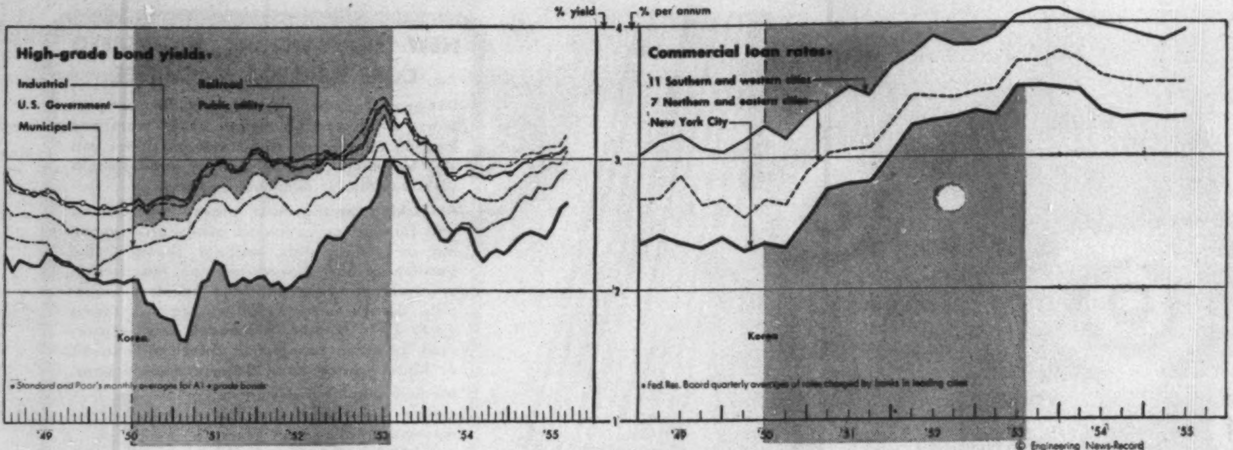

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Higher Money Rates to Even Out Boom

For the next few months, businessmen, state and local governments, and prospective homeowners will probably have to pay higher rates to borrow long-term money for construction. The same will hold true for short-term construction loans from banks and for bank loans to contractors. The situation is subject to fast change, however, if our economy shows signs of recession. There are few such signs right now.

For about a year now, interest rates in the long-term market for bonds and mortgages have been climbing upward (left-hand chart, above). The rise was slow at first, but it has picked up momentum in the past few months. Average rates on commercial bank loans have followed the same trend, though more slowly (right-hand chart, above). Early in August, banks boosted their prime rate—the interest they charge top-credit borrowers—by ¼% to 3¼%. That means rates to other borrowers were boosted all along the line. Another ¼% hike may not be far off.

• How much longer?—The rise in interest rates will continue as long as demands for credit continue as strong as they are now. Our economy is moving into an inflationary stage, fed by higher wages, higher prices, and increases in business inventories. Though state and municipal borrowing has dropped substantially this year, business demands for long-term construction money are strong. And the year's seasonal peak for business bank loans is approaching. Demand for mortgage money should continue strong this fall, in spite of the recent decline in home starts.

• Causes—So the rise in interest rates is partly due to increased demand for money, without a corresponding increase in the supply of long-term savings. But it has also been partly caused by deliberate policies of the Federal Reserve Board, the Treasury, and other government agencies directed toward keeping the boom under control.

In two different offerings this year, the Treasury has sold about $2.7 billion of long-term bonds, reducing by that much the supply of funds available for long-term bonds of corporations and local governments, and for home mortgages. In recent months Federal Reserve has moved to restrict lending powers of commercial banks.

• Curbing the banks—Excess reserves of commercial banks have been reduced to the vanishing point. So the banks must now come to the Federal Reserve banks to borrow money if they wish to expand their loans. Federal Reserve banks around the country have recently boosted the interest rates they charge commercial banks on these loans. Both actions have the effect of making commercial banks cautious about loans, though they can still expand loans if they want to.

• Cutting off the top—FRB's policy has the purpose of "cutting the top off the boom" in order to prevent a serious recession later on. The monthly bank letter issued by New York's First National City Bank explains it this way:

"Official actions taken to restrain credit expansion are not intended to deny . . . money for soundly conceived, useful projects. The question is one of discouraging marginal and additional projects that compete . . . and raise prices against everybody. After all, supplies of labor and materials have limits; rising business costs and prices signalize in the free economy that we are trying to do too much, saving too little, drawing excessively on our credit lines."

Even if this cautious atmosphere continues through 1956, there will be plenty of money available to finance a high volume of construction. The difference is that some projects that might have been financed in a period of easy money will have to be postponed.

Bond Yields—Per Cent

Standard & Poor's

	Govt (1)	U. S. Treas (2)†	Municipal (3)	Industrial (4)	Pub Util (5)	Railroad (6)
1932	....	3.68	4.65	5.58	5.04	5.37
1933	....	3.31	4.71	4.98	4.69	4.54
1934	....	3.12	4.03	4.28	4.19	4.01
1935	....	2.79	3.40	3.73	3.59	3.58
1936	....	2.69	3.07	3.34	3.38	3.31
1937	....	2.74	3.10	3.16	3.22	3.46
1938	....	2.61	2.91	2.82	2.99	3.60
1939	....	2.41	2.76	2.64	2.83	3.39
1940	....	2.26	2.50	2.57	2.75	3.26
1941	....	2.05	2.10	2.50	2.69	3.16
1942	2.27	2.09	2.36	2.54	2.71	3.17
1943	2.29	1.98	2.06	2.55	2.64	3.10
1944	2.38	1.92	1.86	2.58	2.64	3.01
1945	2.34	1.66	1.67	2.50	2.59	2.75
1946	2.19	Disc.	1.64	2.44	2.50	2.59
1947	2.24	....	2.01	2.52	2.59	2.62
1948	2.43	....	2.40	2.70	2.83	2.89
1949	2.28	....	2.21	2.53	2.69	2.71
1950	2.32	....	1.98	2.48	2.63	2.66
1951	2.60	....	2.00	2.72	2.89	2.91
1952	2.68	....	2.19	2.87	3.01	2.98
1953	2.90	....	2.72	3.08	3.27	3.19
1954	**2.51**	....	**2.34**	**2.73**	**2.95**	**2.91**
J	2.65	....	2.50	2.92	3.07	3.08
F	2.58	....	2.39	2.76	2.99	2.97
M	2.49	....	2.38	2.68	2.90	2.88
A	2.44	....	2.47	2.68	2.90	2.86
M	2.51	....	2.49	2.72	2.95	2.87
J	2.52	....	2.48	2.77	2.96	2.90
J	2.44	....	2.31	2.72	2.93	2.89
A	2.45	....	2.23	2.70	2.92	2.87
S	2.49	....	2.29	2.70	2.95	2.88
O	2.51	....	2.32	2.70	2.95	2.89
N	2.54	....	2.29	2.72	2.95	2.90
D	2.56	....	2.33	2.72	2.95	2.89
1955						
J	2.65	....	2.39	2.80	2.98	2.92
F	2.71	....	2.42	2.86	3.03	2.97
M	2.70	....	2.45	2.89	3.05	2.99
A	2.77	....	2.43	2.89	3.04	3.01
M	2.76	....	2.41	2.94	3.09	3.02
J	2.77	....	2.48	2.97	3.10	3.02
J	2.87	....	2.62	2.96	3.10	3.05
A	2.91	....	2.67	3.06	3.18	3.08

(1) aver. taxable long-term government bonds to replace the long-term Treasury bond series discontinued after December, 1945.
(2) aver. partially tax exempt long-term Treasury bonds, not due or callable for fifteen years. †Federal Reserve Bulletin.
(3) aver. 15 high-grade long-term municipals.
(4) aver. A1+ industrials.
(5) aver. A1+ public utilities.
(6) aver. A1+ railroads.

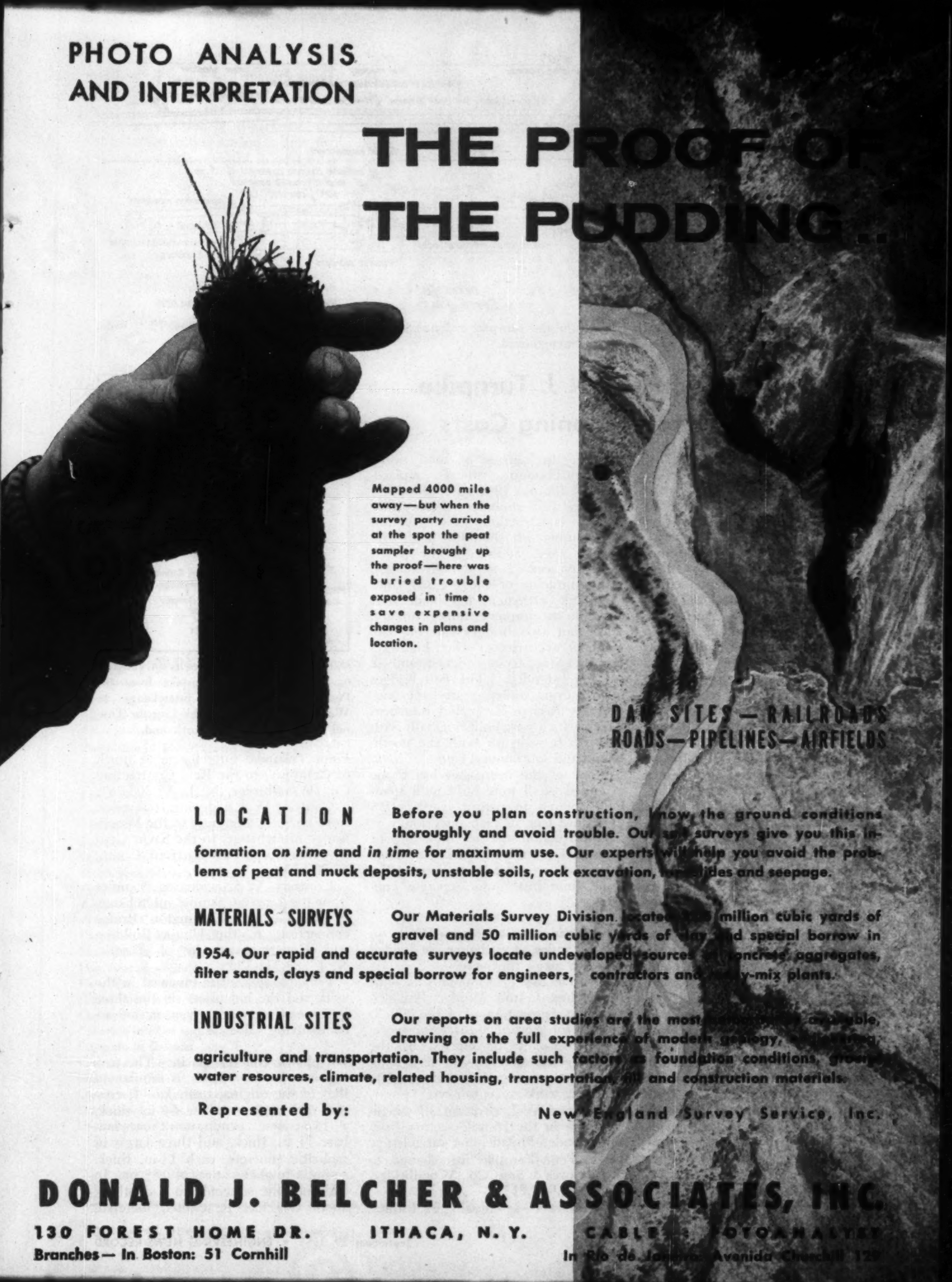

PHOTO ANALYSIS AND INTERPRETATION

THE PROOF OF THE PUDDING...

Mapped 4000 miles away—but when the survey party arrived at the spot the peat sampler brought up the proof—here was buried trouble exposed in time to save expensive changes in plans and location.

DAM SITES—RAILROADS
ROADS—PIPELINES—AIRFIELDS

LOCATION Before you plan construction, know the ground conditions thoroughly and avoid trouble. Our soil surveys give you this information on *time* and *in time* for maximum use. Our experts will help you avoid the problems of peat and muck deposits, unstable soils, rock excavation, landslides and seepage.

MATERIALS SURVEYS Our Materials Survey Division located [illegible] million cubic yards of gravel and 50 million cubic yards of clay and special borrow in 1954. Our rapid and accurate surveys locate undeveloped sources of concrete aggregates, filter sands, clays and special borrow for engineers, contractors and ready-mix plants.

INDUSTRIAL SITES Our reports on area studies are the most [illegible] available, drawing on the full experience of modern geology, [illegible], agriculture and transportation. They include such factors as foundation conditions, ground water resources, climate, related housing, transportation, fill and construction materials.

Represented by: New England Survey Service, Inc.

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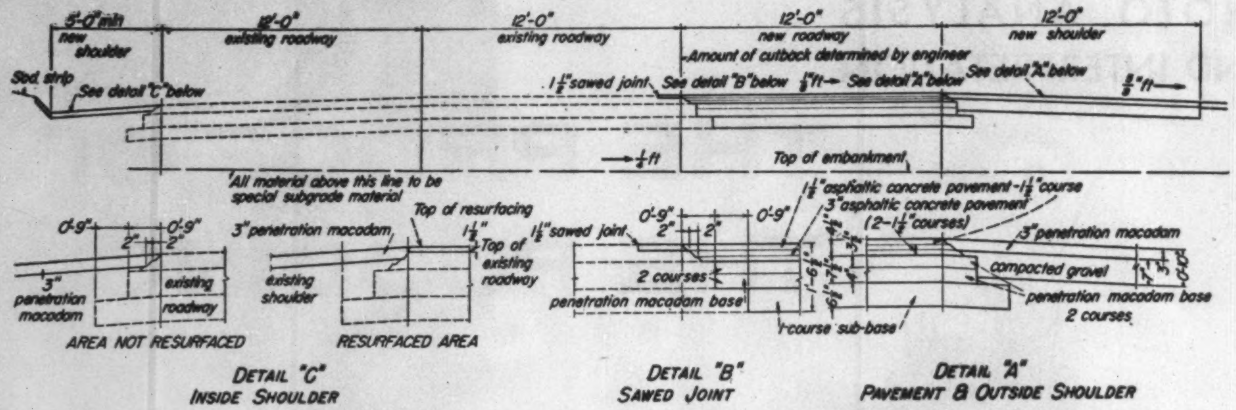

5'-0" min
new shoulder
12'-0"
existing roadway
12'-0"
existing roadway
12'-0"
new roadway
12'-0"
new shoulder
Amount of cutback determined by engineer
Sod strip
See detail "C" below
1½" sawed joint
See detail "B" below
⅛"ft →
See detail "A" below
See detail "A" below
⅜"ft →
→ ¼ft
Top of embankment
All material above this line to be special subgrade material
0'-9"
0'-9"
2"
2"
3" penetration macadam
existing roadway
3" penetration macadam
Top of resurfacing
1½"
Top of existing roadway
existing shoulder
AREA NOT RESURFACED
RESURFACED AREA
1½" sawed joint
0'-9"
2"
2"
0'-9"
2 courses
penetration macadam base
1'-6½"
1½" asphaltic concrete pavement-1½" course
3" asphaltic concrete pavement (2-1½" courses)
1-course sub-base
3" penetration macadam
compacted gravel
penetration macadam base 2 courses
DETAIL "C" INSIDE SHOULDER
DETAIL "B" SAWED JOINT
DETAIL "A" PAVEMENT & OUTSIDE SHOULDER

A THIRD LANE is being added to each roadway of the turnpike and new and more substantial outside shoulders, 12 ft wide, are being built. The inner shoulders also are being strengthened.

Protection of Traffic on N. J. Turnpike Adds Materially to Widening Costs

Making certain that the work of widening 61 miles of the New Jersey Turnpike will cause no serious delays to the steadily mounting volume of traffic using that highway is costing the New Jersey Turnpike Authority over one million dollars. The lump-sum bids on a special item for "Protection of Traffic" in the widening contracts total to that amount. But the full cost of keeping interference with traffic at a minimum will be much higher because the limits set in the contract specifications on use of traffic lanes by contractors are so strict that they must be reflected in the unit prices bid on many items.

Most of the widening work now in progress is along both sides of a 56-mile stretch from the interchange serving the Philadelphia-Camden area to the interchange at Woodbridge, N. J. North of Woodbridge the turnpike was constructed initially with six or eight lanes as far as the Lincoln Tunnel connection at Secaucus. Beyond Secaucus, the four lanes built originally are being widened to six to the George Washington Bridge connection, a distance of five miles.

• Widening urgently needed—Widening of the 56-mile section from Camden to Woodbridge is badly needed. Traffic on that part of the turnpike already far exceeds the engineers' predictions when the highway was built, and it soon will be augmented by traffic from the Pennsylvania Turnpike over the new connection that now is under construction and from the Newark Bay-Hudson County extension, which also is far advanced. The latter will provide a direct link to the busy Holland Tunnel entrance to New York.

Briefly, the current work includes construction of a third 12-ft traffic lane on the outside of both north and southbound roadways, replacement of the old 10-ft outer shoulders with new 12-ft shoulders of more substantial construction, reconstruction of the inner 5-ft shoulders along the median zone, adding to the paved widths of access lanes at interchanges, and resurfacing of the original lanes where fill settlement has made that desirable to improve riding quality.

All but two bridges carrying the turnpike over rivers, other highways or railways are to be widened, and all culverts extended. The two bridges not requiring widening are large ones over the Raritan River and Rancocas Creek, which were built originally with deck 36 ft wide for both the northbound and southbound lanes.

None of the overpasses has to be extended as all were built with spans long enough to permit construction of a third lane in each direction.

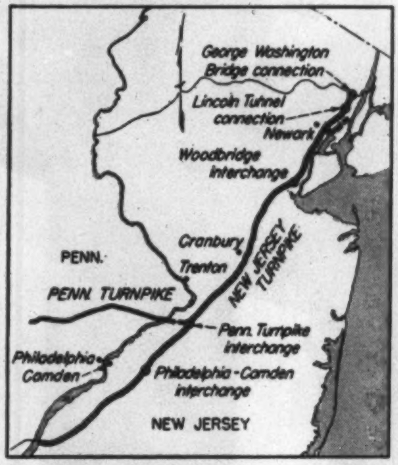
Construction of two new service areas and extensive repaving at existing service areas are being done at the same time but under separate contracts.

• Five widening contracts—Work on the 61 miles of widening is divided into five major contracts:

Contract W-1 ($380,380) is with the Belmont Iron Works, Philadelphia, for fabrication of 4,500,000 lb of steel for the bridge extension work. This steel is being erected by the widening contractors. The remaining four contracts covering the complete widening work are as follows:

Contract W-2, covering all widening work in the 16-mile section from the Camden-Philadelphia interchange to the Penn-Turnpike interchange, to S. J. Groves & Sons Co., Woodbridge, N. J., $4,965,713.

Contract W-3, widening 22.4 miles, Penn Turnpike interchange to north of Cranbury, to the Reid Contracting Co., Woodbridge, N. J., $7,303,287.


George Washington Bridge connection
Lincoln Tunnel connection
Newark
Woodbridge interchange
Cranbury
Trenton
NEW JERSEY TURNPIKE
PENN.
PENN TURNPIKE
Penn. Turnpike interchange
Philadelphia
Camden
Philadelphia-Camden interchange
NEW JERSEY

WIDENING to six lanes is in progress on the New Jersey Turnpike from the Pennsylvania Turnpike interchange to Woodbridge, and from the Lincoln Tunnel connection to the north end.

Contract W-4, widening 16.9 miles, from north of Cranbury to the Woodbridge interchange, to the Savin Construction Corp., East Hartford, Conn., $5,707,338.

Contract W-5, widening 5 miles from the Lincoln Tunnel interchange to the George Washington Bridge connection, to the Union Building and Construction Co of Passaic, N. J., $2,733,376.

Principal quantities involved in the work and the bid prices on the three larger contracts are given in an accompanying table.

• Asphaltic concrete paving—The paving on the new lanes is similar to that of the original turnpike. It consists of a stone sub-base 6½ in. thick, a two-course penetration macadam base 7½ in. thick, and three layers of asphaltic concrete, each 1½-in. thick, giving a total thickness of 18½ in. In addition, the subgrade to a depth of about two feet is selected material, compacted to not less than 95 percent of maximum density.

Before placing the subbase, this subgrade is pretested by four passes of a rubber-tired roller having a tire load of not less than 25,000 lb and a tire pressure of not less than 140 psi.

The 6½-in. thick subbase is an intimate mixture of graded aggregate and soil binder ranging from 100 percent passing the 2-in. sieve to 5-15 percent passing the No. 200 screen. After spreading, it is rolled until a minimum density of 95 percent is obtained.

The penetration macadam base is required to be placed in two layers, 4 in. and 3½ in. thick. Stone sizes in both range from 100 percent passing the 2½ in. sieve to 0-2 passing No. 200. Choke-stone sizes are ⅝-in. and ⅜ in., with only the ⅜-in. size used following the second application of bituminous binder.

Spreading of the stone in each layer is followed by two passes of a vibrating tamper and by enough passes of a 10-ton three-wheel roller to produce a firm surface with no creeping ahead of the roller. Pretesting also is required as in the subgrade.

Application of the bituminous binder is at a rate of 0.38 to 0.54 gal per sq yd per inch of depth.

Gradation of stone in the asphaltic-concrete is similar to that in the original turnpike paving except that the top size is smaller—100 percent passing the ¾-in. sieve instead of the 1-in. sieve. The asphaltic cement ranges from 5.0 to 6.5 percent by weight. This surfacing material, as noted previously, is placed in three layers, each 1½-in. thick.

Preliminary to placing the top layer, the upper 1½ in. of the surfacing in the adjoining lane is removed back to a sawed joint located far enough from the edge to be beyond any major irregularities, generally 6 in. This is designed to insure a smooth-riding connection between the old and new work.

Where settlement of a fill has produced noticeable irregularities in the surface of the original pavement, the existing pavement is being resurfaced with asphaltic concrete.

• **Stronger and wider shoulders** — A major departure from the original turnpike design is being made in building new shoulders for the outside lanes. The original shoulders were 10 ft wide, of surface-treated gravel 10 in. deep. The new shoulders are 12 ft wide and 10 in. deep, made up of 7 in. of compacted gravel topped by 3 in. of penetration macadam.

Similarly, the surface treatment on the 5-ft wide inner shoulders along the median zone is being replaced by 3 in. of penetration macadam.

At the interchanges, the 5-ft wide surface-treated shoulders on the access and exit lanes are being replaced with standard turnpike pavement to increase the usable width of these lanes, most of which are curved. Lanes are being equipped with concrete curbs.

• **Maintenance of traffic** — Elaborate provisions for minimizing interference with traffic are set up in the specifications. From noon on Friday until noon on Monday, two-lane traffic must be maintained in both directions, and no work may be done within 12 ft of a traveled lane unless the work is separated from traffic by a continuous timber barrier curb surmounted by a railing painted with white reflectorized materials.

During the remainder of each week, traffic can be restricted to one lane on either roadway for brief periods on written permission of the engineer.

• **Construction operations**—Because of these restrictions on use of the turnpike, all construction operations are carried on from parallel roadways along the areas graded for the new shoulders of the widened highway. Access to these roads is by temporary

Principal Construction Operations and Costs

Type of Work		CONTRACT W-2		CONTRACT W-3		CONTRACT W-4	
		Quantity	Price	Quantitv	Price	Quantity	Price
Protection of Traffic, (lump sum)		....	$360,000	....	$367,000	....	$300,000
Roadway Excavation, Earth	cu. yd.	457,000	$0.60	361,000	$0.90	314,500	$0.80
Borrow Excavation	cu. yd.	17,000	0.75*	123,500	0.90	198,300	0.70
Select Borrow Excavation	cu. yd.	189,000	0.75	400,000	0.95	260,000	1.10
Topsoiling (4-in.), Stripping or stockpile	cu. yd.	576,800	0.30	565,500	0.29	418,300	0.35
Topsoiling (4-in.), Furnished by contractor	cu. yd.	215,400	.....	386,500	0.35	390,000	0.40
Subbase	sq. yd.	251,900	0.65	354,300	0.40	266,100	0.50
Macadam Base Course	sq. yd.	252,800	2.20	354,300	1.30	265,500	2.00
Bituminous Material for Base Course	gal.	885,000	0.12	1,252,000	0.13	929,200	0.14
Asphaltic Concrete, leveling courses 3″	sq. yd.	248,500	1.45	354,300	1.58	266,000	1.50
Asphaltic Concrete, surfacing course 1½″	sq. yd.	271,500	0.75	369,100	0.79	289,500	0.90
Asphaltic Concrete, resurfacing	tons	3,190	15.00*	21,730	11.00	5,080	10.00
Remove and Replace shoulder base	sq. yd.	228,500	.....	329,700	0.38	243,300	0.30*
Shoulder Stone, Outer shoulder	tons	18,000	6.50	22,000	4.50	9,550	4.00
Pen. Macadam Surface, Outer shoulder	sq. yd.	234,300	1.25	329,700	1.26	243,200	1.50
Pen. Mac. Surface, Inside shoulders	sq. yd.	14,600	1.65	47,200	1.55	17,700	1.75*
Open Footing Excavation	cu. yd.	7,970	12.00*	10,000	12.00	5,500	12.00*
Concrete in Footings	cu. yd.	1,120	40.00	2,363	50.00	1,336	46.00*
Concrete in Piers and Walls	cu. yd.	2,065	65.00	3,648	70.00	1,816	55.00*
Concrete in Culverts	cu. yd.	1,870	70.00	1,406	68.00	450	60.00*
Concrete in Superstructures	cu. yd.	920	95.00*	2,260	85.00	1,798	85.00
Reinforcing Steel	lb.	770,900	0.12	1,051,800	0.18	714,000	0.12*
Concrete Piles, cast-in-place	lin. ft.	11,620	6.00*	15,950	9.50	3,740	6.00*
Underdrains, 8-in.	lin. ft.	17,800	2.60*	56,700	2.40	51,200	3.00
Underdrains, 12-in.	lin. ft.	....	.....	44,360	3.20	2,420	4.25*

* Unit price on items totalling under $100,000

links to highways crossing over or under the turnpike or by temporary connections to local roads outside the turnpike right-of-way.

In general, the sequence of construction operations is to reconstruct the 5-ft wide shoulders along the median, except where resurfacing of the old lanes follows wherever that is required.

As this resurfacing work necessitates single-lane traffic on the turnpike, it can only be done between Monday noon and Friday noon, which means, generally, that it only is done during the three midweek days, of Tuesday, Wednesday and Thursday.

Consequently, to keep the paving crews busy, they are switched to work on the new lanes during the other days of the week. As previously noted, that work must be done behind a barrier curb, which encroaches to a depth of 4 ft on the outer 12-ft traffic lane. However, as the 5-ft wide median shoulder has been reconstructed in most areas where that work is being done, vehicles on the turnpike have no difficulty in maintaining a two-lane flow past the area where crews are working.

• Bridge widening—The work of extending the bridges and widening their decks also is laid out to minimize interference with traffic. To that end, contractors are required to maintain the outer parapet walls on the old decks until piers and abutment walls have been extended and the steel to support the new deck has been set. Then the old parapet walls are removed to permit extension of the concrete deck.

• Engineers and contractors — This work is being done by the New Jersey Turnpike Authority under the general direction of Paul L. Troast, chairman; W. W. Wanamaker, executive director; Charles M. Noble, chief engineer; and Harold W. Goldberger, construction engineer. Howard, Needles, Tammen & Bergendoff, New York, are general consultants.

DeLeuw, Cather & Brill, New York, are consulting engineers on the 56-mile widening work at the south end, with Walter V. Gafke serving as project engineer. On the 5-mile section at the north end, Porter, Urquhart, McCreary & O'Brien are the consulting engineers, with L. Corn as project engineer.

Supervision for the contractors is under E. J. Oak for S. J. Groves & Sons; L. W. Lancaster for the Reid Contracting Co.; J. Donovan for the Savin Construction Corp.; and John DeLeeuw for Union Building & Construction Co.

Open-Deck Parking Increases

Costs and characteristics of large parking garages built since early 1954 reveal some dynamic changes in design and construction as well as in the attitudes of building officials. The accompanying roundup by ENR business news reporters analyzes 39 structures that represent all areas of the nation.

Twenty-six of the buildings were either entirely or substantially open-deck types, an indication of code changes in many sections. According to the cost figures, the open-deck ramp building has several advantages over the walled-in ramp type. Lighting and ventilating costs are reduced appreciably. Also elimination of the weight of exterior wall panels results in framing economy in addition to material savings and reduction of labor costs. As a result of these lower costs for open structures walled-in ramps—only five were reported—seem to be used only when code requirements demand them, or when site conditions are such that open-deck types are not feasible.

In all cases, total costs in tables are exclusive of land costs. The large capacity, two-and three-story garages tend to show a lower building cost per stall than the multi-story structures. Land costs, however, in downtown areas where properties are expensive, might offset the differences. Where land costs range upwards of $20 per sq ft, a 50% reduction in land area covered might make increased height an attractive alternative on a total-cost and unit-cost basis.

As more ramp type garages are built, design variations begin to appear as they have in shopping center and office building design fields. For example, waffle-pattern lift slab construction was used on an open-deck ramp garage in Los Angeles. In Fort Worth, a six-story open-deck type is reinforced concrete with prestressed concrete joists. Garage #3 in Chicago is a split-level design with the levels at one end of the building ½-story above those at the other end.

In California, where earthquake resistance must be built into structures, a 9-story open-deck ramp garage was constructed with a circular ramp that enclosed a 37-ft-long shear wall in its center area, and another West Coast structure was designed with circular ramps at diagonal corners of the building, thus omitting columns in those areas. Omission of the columns made it necessary to analyse each circular wall as two half-bucket shaped beams supporting five stories (ENR, April 29, 1954, p. 45).

Grade level access has been acieved in many of the buildings through utilization of natural ground slopes, and in some cases, the parking levels themselves have been sloped to produce the same result on level sites. Finally, such unusual applications as vertical stainless steel cable barricades and aluminum parapet facings have removed ramp garages from the factory type structures of past years.

• Underground parking costly—In almost every case, the decision to go underground with a parking structure or to build a conventional garage depends upon the extent to which hiding the structure—at substantially increased cost—will benefit the area in which it is to be built.

Most of the completely underground buildings are topped with landscaped parks that must have justified added expenditures in the eyes of the cities involved and their designers. In any case, the use of this land for park purposes has been the deciding factor in almost every instance. The Union Square Garage and the St. Mary's Square Garage in San Francisco are built below city parks, and the 890-car Mellon Square Garage in Pittsburgh is being topped with a garden park and fountain. The great $8.3-million, 2,359-car underground parking facility that replaced Chicago's (Ill.) Grant Park, was constructed with its roof level four feet below street grade to allow for complete restoration of the park.

• Mechanical systems gain—Five of the reported garage structures are mechanically served buildings. Three of these, built under Chicago's ten-structure program, are reinforced concrete construction and generally $800 higher in per-stall cost than reinforced concrete structures of comparable capacities in that area. This higher cost, however, is at least partly offset by the reduction in cubic content of the mechanically served buildings, the smaller area on which the buildings stand (in some cases less than 50% that of the ramp structures) and the faster movement of vehicles in and out of the buildings.

One similar mechanical system in Denver, Colo., shows similar cost per stall also, but parks 480 cars on a site whose area is only 12,500 sq ft. An open steel mechanical garage located in Harrisburg, Pa., parks 240 cars on a site of only 16,800 sq ft, has handled up to 120 car per hour and shows a unit cost report of $6.31 psf, $0.99 pcf and $1,450 per stall.

Cost and Capacity of Off-Street Parking Facilities Compared

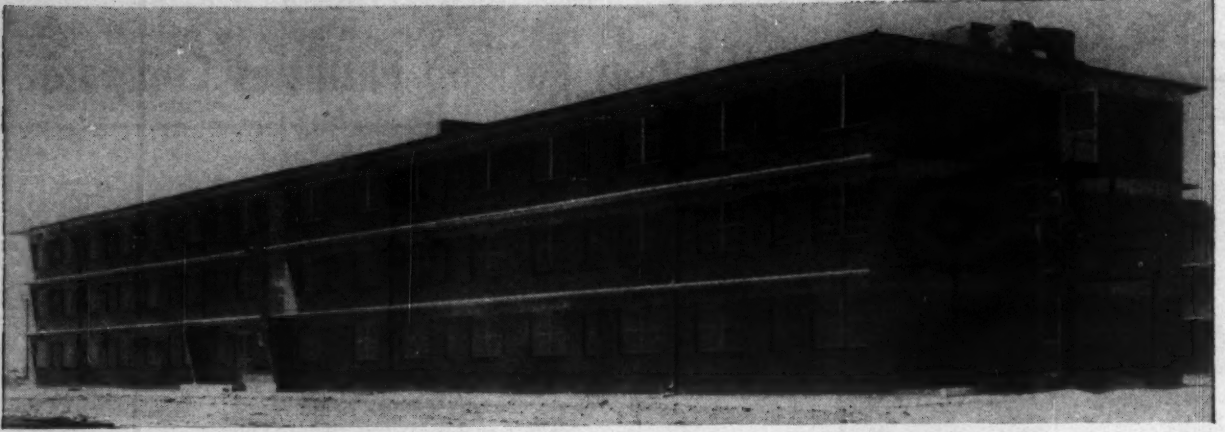
Reported to Engineering News-Record by Owners or Builders

	New England	Mid-West											South
Location	Boston	Chicago (1)	Chicago (2)	Chicago (3)	Chicago (4)	Chicago (5)	Chicago (6)	Chicago (7)	Chicago (8)	Chicago (9)	Chicago (10)	Chicago (11)	Louisville Ky
Cost: $/sq ft	$4.66	$7.43	$4.21	$5.14	$4.12	$6.38	$5.22	$6.21	$6.68	$5.71	$5.27	$9.42	$4.76
$/cu ft	$0.50	0.83	0.69	0.79	0.56	0.61	0.37	1.03	0.64	0.72	0.76	1.22	0.55
$/stall	$1,500.00	2,317.00	1,368.00	1,544.00	1,299.00	2,310.00	1,527.00	2,402.00	2,200.00	1,668.00	1,729.00	3,518.00	1,600.00
Total$	$1,200,000	1,657,000	1,683,000	1,027,000	1,299,000	970,000	1,842,000	615,000	1,089,000	1,084,000	453,000	8,300,000	400,000
Type of structure	WIR	M	ODR	ODR	ODR	M	ODR	ODR	M	ODR	ODR	WIR	ODR
Elevators, passenger no.	N	N	N	N	N	N	N	N	N	N	N	N	1 manlift
vehicular no.	N	5	N	N	N	4	N	N	4	N	N	N	N
vehicular type	—	SA	—	—	—	SA	—	—	SA	—	—	—	—
Type of construction	R.C., S, fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp
Size: levels, above ground	3	13	4	4, split lev	5, split lev	8	4	3	12	8	4	0	3
below grade	1	1	1	0	0	0	0	0	0	0	0	2	0
total parking	4	14	5	4	5	8	4	3	12	8	4	2	3
Area, floor sq ft	257,324	223,000	400,000	200,000	315,000	152,000	353,000	99,000	163,000	190,000	86,000	880,000	84,000
Space, enclosed cu ft	2,380,210	2,000,000	2,800,000	1,300,000	2,300,000	1,600,000	5,000,000	600,000	1,700,000	1,500,000	600,000	6,820,000	721,000
Capacity, stalls, cars	800	715	1,230	665	1,000	420	1,206	256	495	650	262	2,359	250
Cars per hour	—	—	—	—	—	—	—	—	—	—	—	660	100†
Area of land occupied sq ft	64,330	21,000	85,000	52,000	65,500	19,000	131,000	31,000	15,000	42,000	23,500	322,000	20,000
Angle of stalls	90°	90°	90°	90°	90°	90°	90°	90°	70°	90°	90°	90°	90°

	Mid-Atlantic										Mid-West		
Location	Baltimore Md	New York N.Y.	Trenton N.J. (1)	Trenton (2)	Harrisburg Pa	Pittsburgh Pa (1)	Pittsburgh (2)	Pittsburgh (3)	Pittsburgh (4)	Pittsburgh (5)	Columbus O.	Toledo, O O. (1)	Toledo (2)
Cost: $/sq ft	$3.35	$10.00*	$6.29	$3.58	$6.31	$4.54	$6.43	$10.57	$9.99	$5.34	$4.79	$4.48	$3 87
$/cu ft	$0.69	0.83	0.87	0.60	0.99	0.59	0.91	1.24	1.36	0.89	0.64	0.50	0.43
$/stall	$1,571.00	2,083.00	2,284.00	1,311.00	1,458.00	1,412.00	1,852.00	3,932.00	2,821.00	2,101.00	1,461.00	1,008.00	1,105.00
Total$	$550,000	750,000	925,000	375,000	350,000	745,616	1,503,987	3,500,000	2,172,063	1,817,869	843,000	605,000	315,000
Type of structure	WIR	WIR	WIR	ODR	M	ODR	ODR	WIR, ODR	ODR	ODR	ODR	ODR	WIR, ODR
Elevators, passenger no.	1 manlift	N	N	N	N	N	N	N	N	N	2+2 m'lifts	1	1
vehicular no.	N	N	N	N	2	N	N	N	N	N	4	N	N
vehicular type	—	—	—	—	SA	—	—	—	—	—	2A & 2SA	—	—
Type of construction	S, R.C., fp	S, R.C., fp	R.C.	S, R.C.	S	R.C., fp	R.C., fr	R.C., fr	R.C., fr	R.C.	S, R.C., fp	R.C., fp	S, R.C.
Size: levels, above ground	4+R	5+R	2	2	5	5+R	4+R	2	7	7	4+R	3	3
below grade	0	1	2	0	0	0	1	4	¼	0	0	0	1
total parking	5	7	4	2	5	6	6	6	7¼	7	5	3	4
Area, floor sq ft	164,300	105,000	147,240	104,600	55,500	164,160	234,000	331,000	217,500	340,340	175,780	135,000	81,400
Space, enclosed cu ft	798,000	900,000	1,062,600	627,600	355,200	1,262,800	1,657,500	2,813,500	1,593,750	2,042,040	1,321,350	1,215,000	732,600
Capacity, stalls, cars	350	360	405	288	240	528	812	890	770	865	577	600	285
Cars per hour	150-200	120	480	275	120	200†	250	300	220	200†	150	120	85
Area of land occupied sq ft	16,426	15,000	96,600	52,300	16,800	27,360	39,000	48,000	30,000	48,620	36,100	45,000	22,000
Angle of stalls	90°	90°	90°	60°	90°	90°	90°	90°	90°	90°	90°	90°	82°

	West of Mississippi						Far West						
Location	Oklahoma City Okla	St. Paul Minn	Minneapolis Minn	Omaha Nebr	Fort Worth Tex	Denver Colo	Phoenix Ariz	Los Angeles Calif (1)	Los Angeles (2)	San Francisco Calif (1)	San Francisco (2)	Portland Oreg	Seattle Wash
Cost: $/sq ft	$3.47	$5.77	$3.61	$6.40	$3.32	$6.66	$3.06	$2.65	$2.59	$5.71	$5.33	$2.76	$5.88
$/cu ft	—	$0.49	—	0.71	0.37	0.74	0.42	—	0.38	—	—	—	—
$/stall	$1,389.00	1,111.00	860.00	1,081.33	836.00	2,083.33	1,034.00	810.00	693.00	1,667.00	1,600.00	1,012.00	2,740.00
Total$	$750,000	500,000	516,000	186,000	224,000	1,000,000	400,000	963,000	670,000	2,000,000	800,000	340,000	1,000,000
Type of structure	ODR	WIR	WRI, ODR	ODR	ODR	M	ODR, WIR	ODR	ODR	ODR	WIR	ODR	WIR
Elevators, passenger no.	1 manlift	1 manlift	N	N	1 manlift	N	N	N	N	1 manlift	1 manlift	N	N
vehicular no.	N	N	N	N	N	4	N	N	N	2	N	N	N
vehicular type	—	—	—	—	—	A	—	—	—	SA	—	—	—
Type of construction	R.C., fp	R.C., fp	R.C., fp	S, R.C., fp	R.C., fp	R.C., fp	R.C.	R.C., fp	R.C.	R.C., fp	R.C., fp	S, R.C., fp	R.C., fp
Size: levels, above ground	5+R	2+R	5	2+R	4	11	3	3	2	11	3+R	6+R	2
below grade	0	1	2½	0	2	0	0	0	1	1	1	0	2
total parking	6	4	7½	3	6	11	3	3	3	12	5	7	4
Area, floor sq ft	216,000	86,688	143,000	43,560	67,500	137,500	130,500	363,000	259,000	350,000	150,000	120,000	170,000
Space, enclosed cu ft	—	1,011,350	—	261,360	607,000	1,350,000	957,000	—	1,780,000	—	—	—	—
Capacity, stalls, cars	540	450	600	172	268	480	387	1,189	967	1,200	500	336	365
Cars per hour	75	150	125	—	70	125	100	—	—	300†	200†	60	200
Area of land occupied sq ft	40,000*	28,896	21,384	14,520	9,500	12,500	46,420	—	103,000	37,812	38,000	200,000	44,400
Angle of stalls	90°	90°	90°	90°	90°	90°	45°	60°	90°	45°	90°	90°	90°

•† estimated •* part of another structure •ODR open-deck ramp •WIR walled-in ramp •N none reported •M mechanical •A automatic •SA semi-automatic •S steel
• RC reinforced concrete •fp fireproof •fr fire resistant •R roof



NEW DORMITORIES for the Air Force have bearing-wall construction—brick and tile exterior cavity walls and tile partitions.

Brick Wall Costs in 12 Cities

Walls involving the use of brick, alone or in combination with clay tile or concrete block, are high on the list of building elements whose inplace prices are frequently sought by designers and contractors. Not usually ready at hand, such prices in a number of important cities throughout the country have been supplied for this issue by the Structural Clay Products Institute. They are the result of an analysis made by John Barbour, staff engineer of the Institute, of information gathered by the Institute's regional personnel.

Costs are given in the accompanying table for ten types of brick walls and also for hollow-tile partitions, as well as for different thicknesses of the various types of wall. The figures shown are the costs per square foot of the wall in place, including the items of materials, labor, overhead and profit. Stated in another way, they represent the average competitive bid price in the areas indicated.

The types of construction represented are those used in such structures as schools and other buildings of that size where moderate scaffolding, fairly rigid supervision and a normal amount of plumb points prevail. In this connection, the construction may also be considered typical of that used in new dormitories at such Air Force bases as Abilene, Tex.; Little Rock, Ark.; Altus, Okla.; Alexandria, La.; Fort Bragg and Goldsboro, N. C.; and Plattsburgh, N. Y. These three-story structures have load-bearing brick-and-tile cavity-wall exteriors with load-bearing tile interior partitions and concrete floors. And they have been bid as an alternate to an exposed concrete frame with concrete block curtain walls at prices that, according to the Structural Clay Products Institute, which fathered the design, have averaged 2% lower and ranged from 1% to 4% lower.

For the 12 cities shown in the table, comparable costs can be given, but San Francisco and Los Angeles have to be considered separately because of the California state code requirement that all masonry walls must be reinforced to resist seismic loads. Wall costs in these cities are, therefore, given in a separate tabulation, and include furnishing and placing of the reinforcing steel. It may also be noted, however, that 6-in. hollow tile partitions in San Francisco cost 70¢ per sq ft and that 8-in. brick-and-brick walls average $1.40 per sq ft when they are permitted to be built.

Costs Per Square Foot in Twelve Cities

Type of Construction	Wall Thickness	Atlanta	Birmingham	Cincinnati	Columbus, O.	Dallas	Denver	Detroit	Kansas City	Minneapolis	New Orleans	Pittsburgh	Seattle
							$ per sq ft						
Veneer on frame (Cost to include entire assembly less interior finish)	4"	1.25	1.24	—	1.55	1.30	1.35	0.89	1.05	2.10	1.39	1.33	1.20
SCR brick	6"	1.09	1.08	—	1.48	1.10	1.23	1.08	1.05	1.44	1.18	1.17	1.40
Brick and brick	8"	1.62	1.62	2.65	2.70	1.80	1.57	2.26	1.85	2.22	1.93	2.32	1.98
Brick and brick	12"	21.0	2.10	3.35	3.35	2.51	2.18	3.05	2.65	3.12	2.79	3.40	
Cavity Wall (Brick and brick)	10"	1.67	1.67	2.80	2.84	1.80	1.68	2.26	1.85	2.76	1.93	2.49	2.30*
Cavity Wall (Brick and block)	10"	1.40	1.36	2.05	2.10	—	1.40	1.89	1.60	2.00	—	1.95	
Cavity Wall (Brick and tile)	10"	1.41	1.40	2.10	2.20	1.42	1.43	1.90	1.70	2.04	1.52	2.10	
Cavity Wall (Brick and facing tile, unglazed)	10"	2.28	2.28	3.00	2.90	1.82	1.51	2.32	2.05	2.70	1.95	2.65	
Cavity Wall (Brick and facing tile, glazed)	10"	2.54	2.54	3.10	3.00	2.54	2.49	2.51	2.65	3.24	2.72	2.87	
Brick and block	8"	1.36	1.35	1.95	2.05	—	1.37	2.16	1.60	1.74	—	1.89	
Brick and block	12"	1.47	1.44	2.15	2.25	—	1.64	1.67	1.75	2.04	—	2.06	
Brick and tile	8"	1.39	1.39	2.00	2.90	1.43	1.37	1.56	1.70	1.86	1.53	1.95	
Brick and tile	12"	1.58	1.58	2.70	3.60	1.78	1.78	1.79	1.90	2.16	1.91	1.98	
Hollow tile	6"	0.55	0.56	0.70	0.65	0.73	—	0.55	0.60	0.56	0.78	0.59	
Hollow tile	8"	0.68	0.68	0.75	0.70	0.85	—	0.61	0.75	0.92	0.91	0.69	1.12
Hollow tile	10"	0.78	0.78	0.85	0.80	0.88	—	0.73	0.90	0.93	0.94	0.77	

* Cavity wall using jumbo brick—$1.50

Reinforced Brick Walls

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9" RGBM (reinforced grouted brick masonry) standard sized commons	$1.77
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8" RGBM, Roman F. B. plus oversize commons	2.15
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4" Roman or Norman veneer on concrete	1.35
San Francisco	
8" RGBM, oversize commons	1.82
9" RGBM, oversize commons	2.07
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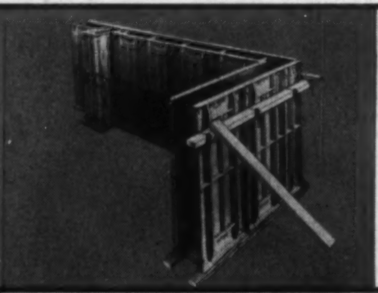

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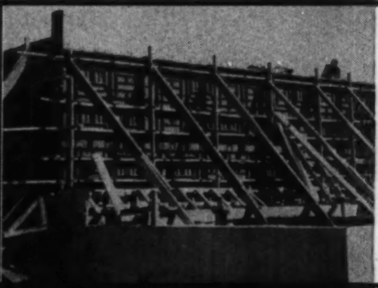

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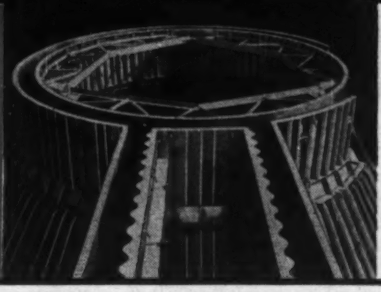

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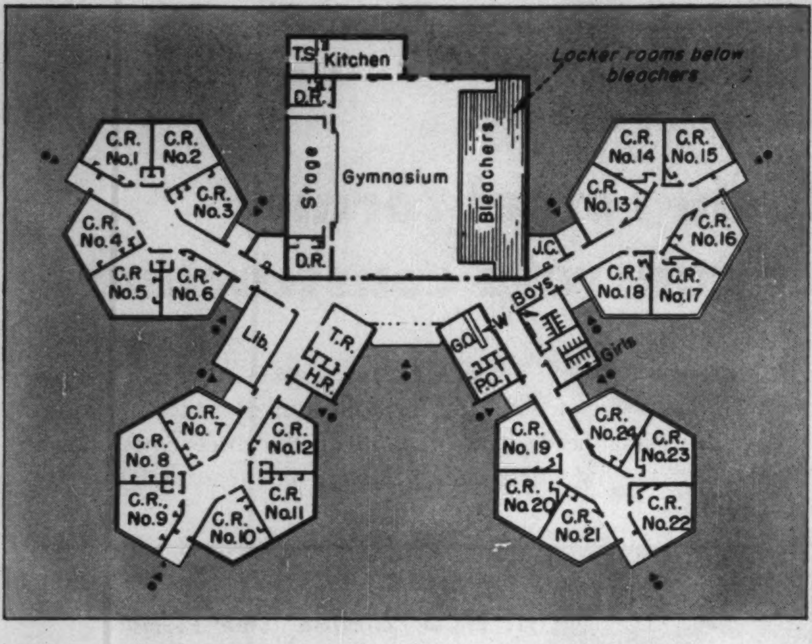
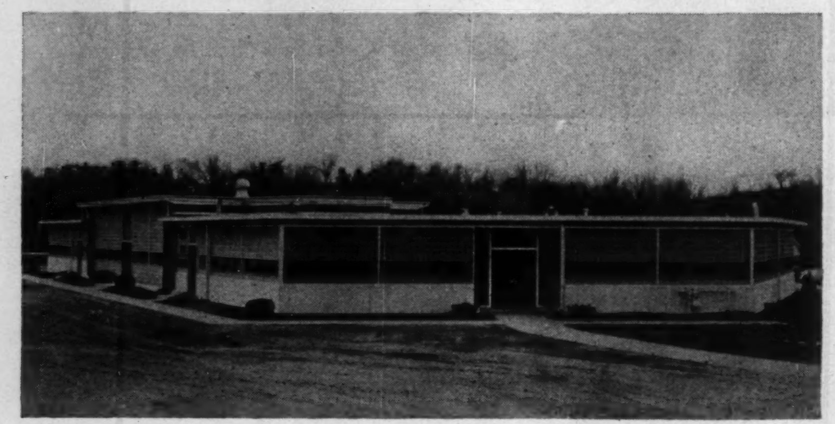


Many Savings Result From Plan for . . .



. . . Schools With 5-Sided Classrooms

While school construction costs are still hovering around $20 per sq ft in some cities, good school buildings are being erected in the Midwest at about $7 per sq ft ($0.50 per cu ft). Maintenance costs also are expected to be low.

Though designed by different architects, these low cost schools have several important elements in common. They are based on a design, called the Maximlite School, developed by T. Ewing Shelton, architect, Fayetteville, Ark. Key element is a five-sided classroom, which plays a major role in cost reduction.

• How money is saved—Advantages claimed for this design include high-quality natural lighting, satisfactory acoustics and good ventilation. Construction savings result principally from a tight plan and elimination of unnecessary decoration. Structural members are left exposed wherever possible and plaster is omitted. Windows, heating ducts and other components are standardized. And the buildings can be erected without specialized equipment or specially skilled workmen.

The buildings generally are one-story high. Around the perimeter, the roof is supported on steel columns. Interior walls are of load-bearing construction—lightweight concrete block with glazed wainscoting. There are no basements; floors are reinforced concrete slabs on ground, generally with asphalt or vinyl tile finish. Roof construction varies, in some cases being wood, in others, steel decking or open-web steel joists with gypsum or concrete deck. The decks are topped with insulation board and 20-year-bonded builtup roofing. Ceilings are fiberboard.

The exterior is reinforced concrete to sill height and glass block to the roof. The glass block is interrupted by a continuous vision strip with operable sash.

Probably the greatest savings with Maximlite Schools result from the arrangement of facilities. The five-sided classrooms are combined to form hexagons or other polygons with more sides. These shapes are economical because they yield a relatively high ratio of floor area to exterior-wall area. Also, little space is wasted in corridors.

• Two exterior walls per room—But in addition to their economical plan, the five-sided classrooms also offer the advantage of excellent natural lighting. Each has two exterior walls of glass block, which intersect at a 120-deg angle. Light is thrown upward by the glass block and reflected from the ceiling and skewed interior walls. The result is nearly uniform lighting throughout.

A test showed that with an average of 6,500-ft-c on the exterior (brilliant sun at 3 pm), light intensity on desk tops varies from 205 to 665 ft-c, or less than 4 to 1. With 1,000 ft-c on the exterior (overcast day), intensity varies from 38 to 115—again less than 4 to 1.

The shape of the rooms also facilitates good natural ventilation. In addition, the heating system introduces fresh air as desired.

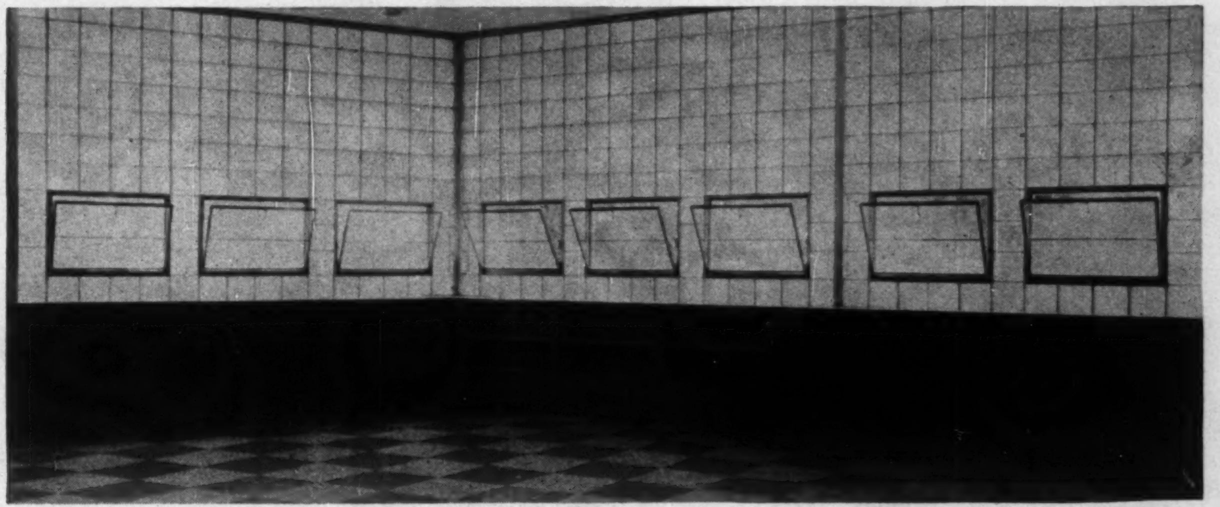
• Novel heating system—Classrooms are heated with warm air supplied by gas or oil-fired unit heaters. When gas is available, each classroom usually has its own heater (65,000 or 85,000-Btu capacity). With oil, one unit (110,000 to 170,000-Btu capacity) may be used to heat two classrooms.

The heated air is distributed through a perimeter duct system. The ducts are built into prefabricated metal bookcases, which are placed along the two outer walls of each classroom. A gas-fired heater may be incorporated in the bookcase arrangement, its top serving as a work table. Oil-fired heaters are placed in fire-resistant closets about 4 ft square at the rear of a classroom.

A 6-classroom school at Linden, Pa., with a floor area of 7,800 sq ft, was heated with No. 2 oil from Oct. 1, 1954, to Feb. 15, 1955, at a cost of only $280. During one month, the temperature went as low as −6 F and seldom exceeded 10 F, yet the heating plant proved adequate.

To date, 52 of these Maximlite schools, with 475 classrooms, have been completed or are under construction. Another 50, with 480 classrooms, now are in the planning stage.

CLASSROOMS in Maximlite Schools, such as this one in Wheaton, Mo., get excellent lighting through two glass-block walls.



PERIMETER HEATING is achieved with warm-air ducts incorporated in metal bookcases under the windows.

Construction Costs for Maximlite Schools

Location	Date	Classrooms	General purpose rm.	Cafeteria-kitchen	Study hall	Health room	Teachers lounge	Offices	Storage	Toilets	Gymnasium	Locker-showers	Stage-dressing rooms	Total cost	Cost per sq ft
Green Forest, Ark.	1951	6	1	1	—	—	—	1	2	2	—	—	—	$68,294	$8.79
Eureka Springs, Ark.	1951	16	—	1	1	1	—	2	2	4	—	—	—	122,111	5.65
Cotton Plant, Ark.	1952	12	—	1	1	1	—	2	2	4	—	—	—	94,322	5.53
Moro, Ark.	1952	10	—	—	—	—	—	—	—	2	—	—	—	58,123	5.47
Paragould, Ark.	1952	3	1	1	—	—	—	1	—	2	—	—	—	32,706	7.59
Avilla, Mo.	1952	8	1	1	—	1	—	1	—	2	—	—	1	70,048	5.70
Pleasant Hope, Mo.	1952	8	1	1	—	1	—	1	—	2	—	—	1	81,159	6.60
Wheaton, Mo.	1952	10	1	1	—	1	1	1	—	2	—	—	—	80,355	5.92
St. Paul, Kan.	1952	8	—	1	—	—	—	3	3	2	1	2	1	128,931	6.16
Stockton, Mo.	1952	12	1	1	—	—	—	1	2	2	—	—	1	99,886	6.15
Wellsville, Mo.	1953	10	1	1	—	—	1	1	2	2	—	—	1	91,329	6.28
Branson, Mo.	1953	16	1	1	—	—	1	1	3	4	—	—	1	138,369	5.46
Haynes, Ark.	1953	5	1	—	—	—	—	1	1	4	—	—	1	45,116	6.47
Platte City, Mo.	1953	6	1	1	—	1	1	1	4	2	—	—	—	87,836	7.18
Caney, Kan.	1953	17	1	1	—	1	1	2	4	4	1	2	2	253,350	7.34
New London, Mo.	1953	8	—	1	—	1	1	1	2	2	1	2	2	129,139	6.07
South Mounds, Kan.	1953	2	1	1	—	1	1	1	2	2	—	—	—	17,600	6.40
Jasper, Mo.	1953	3	—	—	—	—	—	2	2	—	—	—	—	25,925	7.13
Carl Junction, Mo.	1953	8	1	—	—	1	—	1	2	—	1	2	2	94,156	6.34
Erie, Kan.	1953	12	1	1	1	1	1	2	1	2	1	2	2	268,535	7.38
Wrightsville, Ark.	1953	6	—	1	1	1	1	2	1	2	1	2	2	139,957	6.14
Webb City, Mo.	1953	10	1	1	—	1	1	2	1	2	—	—	—	113,524	6.69
Broken Arrow, Okla.	1954	8	1	1	—	1	1	2	1	2	—	—	—	77,900	6.66
Helena, Ark.	1954	9	—	1	1	1	1	1	—	2	1	1	—	166,228	5.73
House Springs, Mo.	1954	15	—	—	1	—	—	2	1	2	1	2	2	331,985	7.34
Grenola, Kan.	1954	6	—	—	—	1	1	1	—	2	1	—	2	149,595	7.48
Barton, Ark.	1954	8	1	1	—	1	1	1	2	2	—	—	—	86,679	6.37
Fayetteville, Ark.	1954	6	1	1	—	—	—	1	1	4	—	—	—	76,319	7.27
Kechi Center, Kan.	1954	8	1	—	—	1	1	1	2	2	—	—	—	110,486	7.90
Freeport, Kan.	1954	2	1	1	—	—	—	—	—	2	—	—	—	49,144	7.87
Offerley, Kan.	1954	14	1	1	—	1	1	2	—	4	1	2	—	265,923	7.98
Rosedale, Ind.	1954	16	—	1	—	—	—	1	2	4	1	2	—	283,517	7.40

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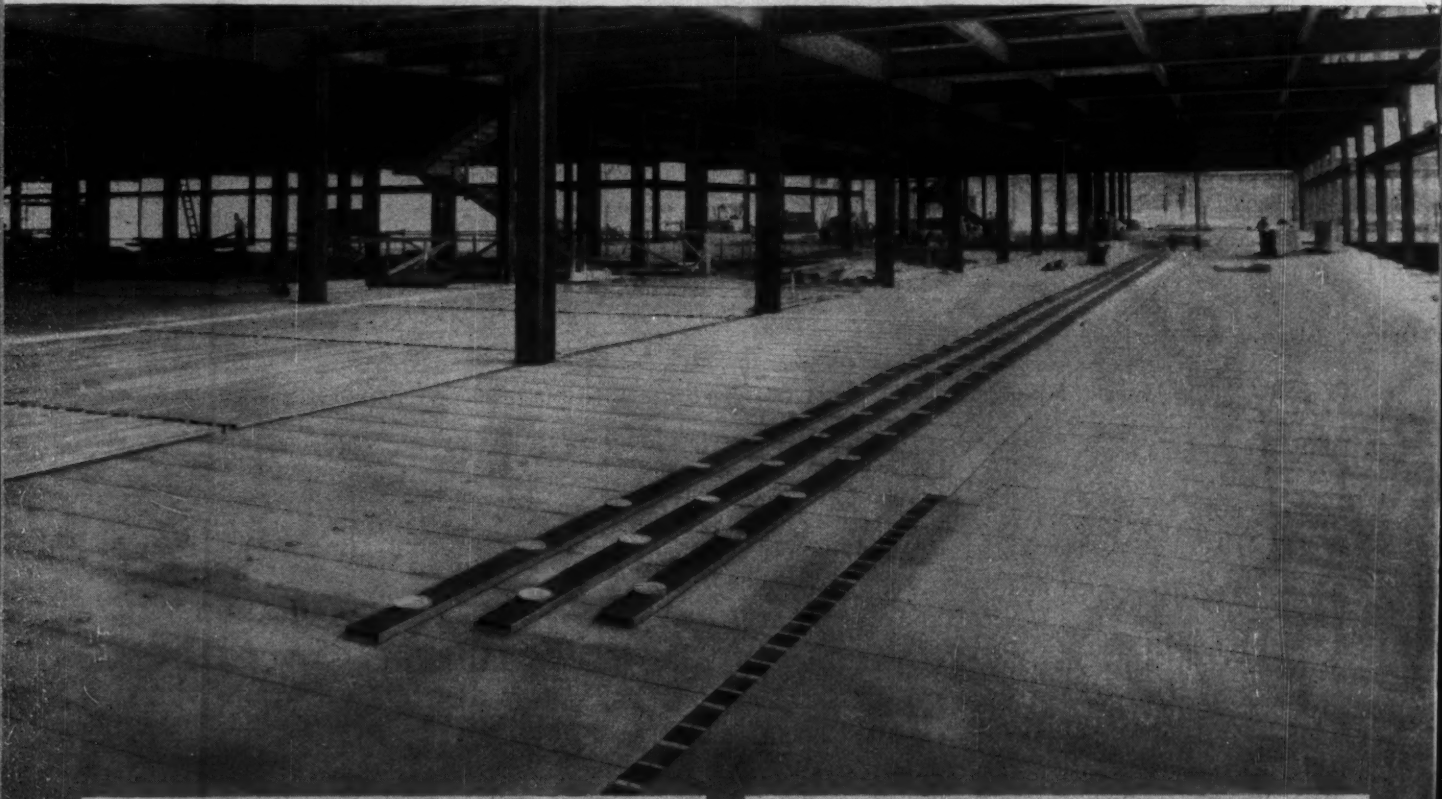

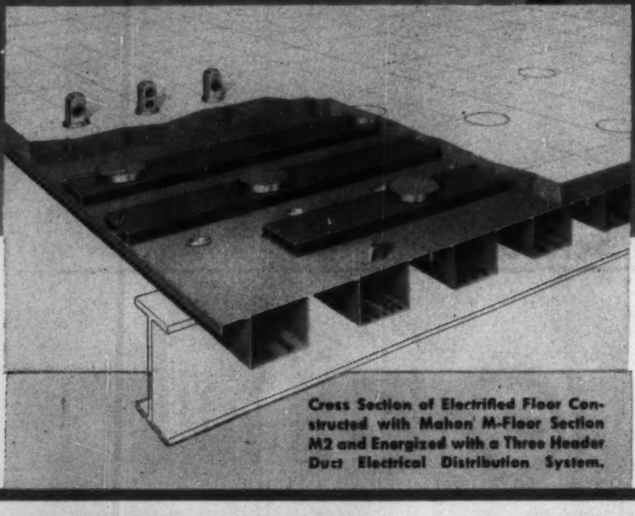

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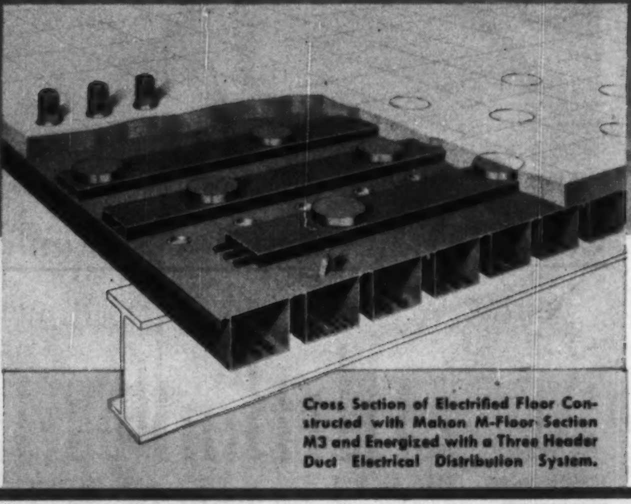

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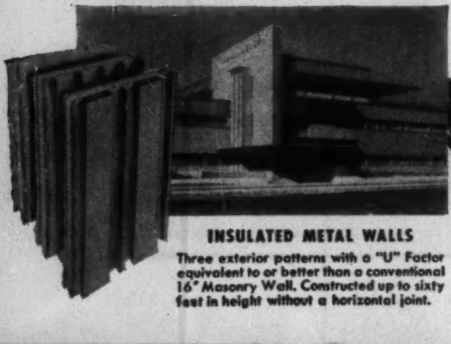

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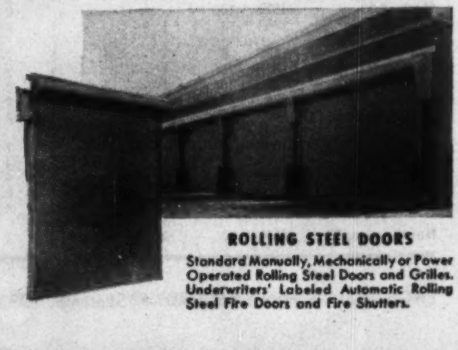

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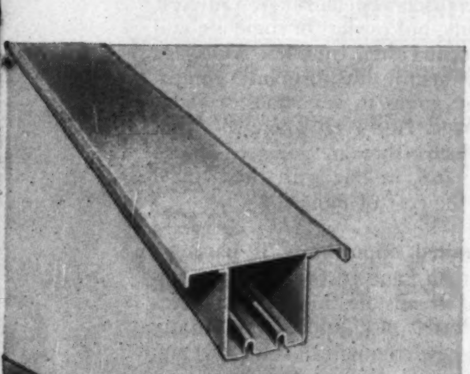

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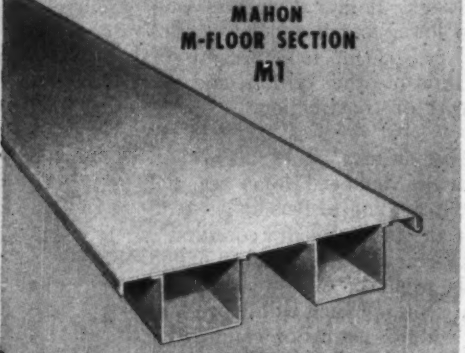

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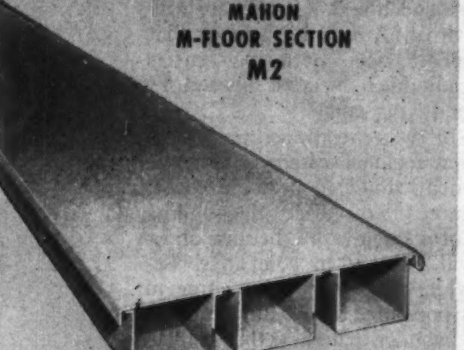

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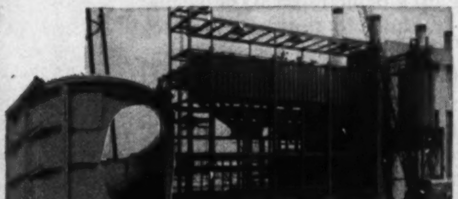

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Shopping Centers: Unit Costs and Problems

The suburban shopping center, offering easy access by car as compared with the more congested downtown business district, is a conspicuous feature of our prosperous postwar U.S. economy. It has done a good deal to sustain the construction boom by opening up new business for architects, engineers, and contractors, as well as for the more specialized "developers".

• **Types of centers**—We should first define our terms. There are several types of centers:

(1) The neighborhood center, usually a strip development on a main road, with some parking facilities. It sells "convenience" goods—food, drugstore items, hardware, and other things which people usually buy without shopping around. This type features one or two supermarkets, plus a drug store, variety store, and other shops. Except possibly for a second supermarket, there is no planned competition within the center though a supermarket (for instance) may sell some items you can get in a drug store or variety store.

(2) The regional shopping center, whose prototype is generally considered to be Seattle's Northgate, opened in 1950. Though several big centers were built before Northgate, it introduced the principle of admitting competing stores and grouping them together. According to one definition, a regional center has at least 50 acres of space (mostly parking), a building area over 600,000 sq ft (of which one-half to two-thirds is sales space), including at least one major department store, and located on at least two major traffic arterials. It offers both convenience goods and "shopping" goods, plus some of the services of downtown —including banking, beauty salon, dry cleaning, medical and dental services, movies. The ratio of parking space to sales space should run four or five to one.

(3) Somewhere between the regional and the neighborhood center is the "semi-regional" or "district" center. It's between the other two in size, and reaches out to a wider area than a neighborhood, but not to a whole region. A "junior" department store is the main attraction. This is usually an upgraded variety store, providing most types of soft goods but not many hard-goods lines. Or it might be a Sears, Roebuck branch.

• **Unit costs**—Unit costs of these centers vary widely. The unit costs shown in the accompanying table range all the way from $4.50 per sq ft for a semi-regional center in Kentucky to $22.50 per sq ft for a semi-regional on a very small plot in Nebraska.

However, the table indicates that the typical unit cost per sq ft for a semi-regional or regional center would be about $10 to $11 per sq ft, with the cost running about $8 per sq ft for the less elaborate centers. These figures are exclusive of land costs, which can vary widely. The cost per sq ft of sales space, another important measure, can also be calculated from the table.

Cost per lineal front foot is another important factor, since store minimum rentals are often based partly on valuable store frontage. Here again the semi-regionals and regionals usually have a much higher unit cost. They generally range above $1,000, while a majority of neighborhood centers in the table are below $1,000.

• **Rentals**—Minimum rentals are usually set at a minimum per sq ft or per lineal ft, or sometimes a combination. Typical minimums might run from $1.25 to $2.00 per sq ft annually, depending on the nature of the center and on how anxious the developer is to get a particular tenant. Front-foot rentals might range from $20 to $40 a month.

There is also a rental percentage on sales, from which the minimum rental is deducted. Sometimes this percentage is lower on sales above a certain figure. The rental percentage varies widely, depending on the type of store and on competitive conditions. For instance, last spring supermarkets were paying 1% or less in new leases. Now a more typical rate is 1½%, because food chains have started competing a little more eagerly for leases.

The minimum rentals are not based on amortization of construction cost and land cost alone. They must pay for interest on borrowed money, maintenance, management and promotion cost, and taxes. Last comes the developer's profit.

• **How many more?**—There are about 35 centers of the regional type already in operation or not far from it, and many hundreds of semi-regional and neighborhood centers. How much more business of this type can construction men expect in the years to come?

The answer is not a simple one. It seems quite likely that volume of shopping center construction is going to level off and perhaps decline for awhile, as developers, tenants, and investors analyze what has been happening in the past few years. We still have a great deal to learn about how shopping patterns will develop after the novelty of the big new centers has worn off. Some centers have had declines in sales.

Faulty layout and choice of building materials seem to have been major factors responsible for the default last year of the owner of Shopper's World near Boston, one of the earliest of the regionals. No other big centers have been reported as defaulting on interest payments, but owners of some are said to be having their troubles. Mortgage lenders—mainly life insurance companies—are going to get choosier about their loans. And even where they find sound loans, they are going to charge higher rates, in line with the general rise in the cost of money.

• **Unlimited opportunity is passing**—The Urban Land Institute, a close student of trends in this field, believes that "the day of unlimited opportunity for the new commercial centers is rapidly passing." It says a squeeze is on between lower rentals and lower sales volume per square foot because of competition of other centers, and the rising cost of construction.

• **How big an area?** How big a trading area do you need for a regional center? According to Robert H. Armstrong, an independent consultant, trading areas of less than 250,000 probably won't be able to support a regional center. Much will depend, of course, on the nature of competitive facilities, and how far people are willing to drive. Armstrong believes that experience has shown the big centers don't pull much business beyond 15 minutes driving range.

One of the generally-accepted theories about regional centers is that two department stores in a single center have more than twice the pulling power of a single store, because shoppers will be able to compare prices and styles. This may well be true in densely-populated areas. But some observers wonder whether the branch-store idea isn't in danger of being pushed too far.

• **Branch dangers?**—One downtown department store may decide to come into the center because its competitor is setting up a branch in the center, or because it wants to shut out a competitor. But there is a real danger—and some statistical evidence—that branch stores can hurt the growth of their parent store downtown. Though total sales of the whole operation increase, overhead climbs faster. As one observer put it: "Sometimes it's a case of cutting your own throat to keep somebody else from doing it."

- **Downtown advantages**—Along with all this, it should always be kept in mind that the central shopping area still has plenty of advantages.

The results of study that was conducted by the Highway Research Board (which covered Columbus, Houston, and Seattle) indicated that buyers felt downtown has: (1) greater variety of styles and sizes (2) greater variety and range of price and quality (3) more bargain sales (4) best place to meet friends from other parts of the city for a shopping trip together (5) better delivery service (6) convenience to rapid transit.

The trend to shopping center construction has by no means run its course. But some of the early glamor has worn off for developers, tenants, and investors. There may very well be a decline in this type of business for the next few years. Looking into the long-range future, however, you can expect another wave of center construction when large numbers of children born in the past 10 or 12 years get married and move into homes still further away from the old downtown business sections.

Shopping Center Construction Costs and Services

Reported by architects, engineers, owners, contractors

Location of Shopping Center	Calif 1 Southern	Calif 2 Southern	Calif 3 Northern	Calif 4 Northern	Calif 5 Northern	Arizona 1	Arizona 2	Colorado 1	Colorado 2	Colorado 3	Nebraska 1	Wisconsin 1	Wisconsin 2
Cost (exclusive of land purchase):													
of shopping center, total	$14,000,000	$6-8,000	$1,400,000	$1,625,000	$825,000	$420,000	$1,050,000	$4,450,000[6]	$386,000	$1,500,000	$4,500,000	$4,000,000	$12,273,000
of buildings, per sq ft	$10.89*	$7-15	$7-9[9]	$12.50-14[4]	$8[3]	$7*	$8.55*	$11.90	$8.26*	$7.50*	$22.50*	$10.10	$12.83
per cu ft	......	......	......	......	......	......	......	$1.16	$0.75	$0.68	......	......	$0.83
per lineal front ft	$1,959	$2,400	$700	$1,600	$1,400	$868	$1,000	$2,000	$883	$1,744	$1,509	......	$1,379
of sidewalks, per sq ft	$0.47[1]	$0.30	$0.30	......	$0.25	......	......	......[6]	$0.35	$0.50	$0.70[18]	......	$0.56
of parking area, per sq ft	$0.14	$0.30	$0.22	......	$0.17	......	......	......[6]	$0.22	$0.23	......	......	$0.52
Size: Number of Stores	16 + 1	12 & 1	......	......	......	......	......	......	......	......	40	......	51
site, acres	155	20	20	11+	14	6	10	19.8	10	13.61	5	25	63
floor area, incl basements, sq ft	1,285,009	......	150,000	140,000	59,000	60,000	122,500	311,370	46,700	200,000	210,000	337,000	860,000
sales area, sq ft	610,064	305,000	130,000	125,000	47,000	45,000	98,000	......	37,360	120,000	195,000	250,000	482,000
storage & service, sq ft	......	......	20,000	15,000	12,000	15,000	24,000	......	9,360	80,000	15,000	87,000	378,000
store fronts, lin ft	7,148	2,500	2,000	1,000	560	484	1,050	1,850	437	880	2,982	2,800[10]	8,000
enclosed space, cu ft	......	......	......	......	......	......	......	3,196,500	513,700	2,200,000	......	......	13,330,000
sidewalks, sq ft	10,000lf	50,000sf	20,000	......	12,000	6,000	17,000	50,000	13,385	15,900	16,000	......	293,000
parking area, sq ft	2,346,403	......	200,000	250,000	100,000	180,000	300,000	512,000	146,975	480,000	......	......	2,056,000
number of stalls or cars	5,481	2,300	1,000C 200E	1,000	550	400	600	1,670	415	1,201	1,600	1,837	5,250
Height, % of floor area in													
basements, %	0	0	0	0	0	0	6%	43%	0	40%	......	✓	31%
1-story buildings, %	73%	71%	93%	100%	90%	100%	94%	40%	100%	60%	......	100%	0
2-story buildings, %	0	0	7%	0	10%	0	0	17%	0	0	100% on 3 lev	✓	46%
multi-story buildings, %	(3st) 27%	(4st) 29%	0	0	0	0	0	0	0	0	......	✓	23%
Type of Construction	PC	S & PC	Post & beam[2]	TUC, PC-some	CB, TUC[5]	CB & PC	S, Brick	S3, PC1	S, Brick	C	S, PC	CB & Br,[11] PC	S, PC
Special features													
covered arcades or sidewalks	......	✓	✓	✓	......	✓	✓15-ft	......	✓	✓	6	✓	✓
enclosed arcades	......	......	......	✓	......	✓	......	✓	✓	......	6	✓	✓
air conditioning	......	✓	......	✓	......	✓	✓	✓	✓	✓	100%[17]	✓	✓
escalators, how many	......	1 set	......	......	......	......	......	......	......	......	2	......	10
elevators, how many	✓	2P, 1F, 6DW	......	......	......	......	......	......	......	......	2P, 1F	......	10
delivery truck access separated from customer access	2,300lf tunl	✓ Dpf St only	✓	✓	✓	✓	✓	......	✓	✓	2 docks	......	✓
auditorium	......	......	......	......	......	......	......	......	......	......	......	✓	✓
theater	......	......	......	......	✓	......	......	......	......	......	......	......	......
office building	......	......	✓small	......	✓	......	......	......	......	......	12 suites	✓	......
special landscaping	......	✓for shade	✓	✓	✓	✓	......	✓	✓	......	......	......	✓
other	[2]	......	......	......	......	......	......	[6]	......	......	......	[12]	[15]

Location of Shopping Center	Minnesota 1	Minnesota 2	Minnesota 3	Minnesota 4	Tennessee 1	Kentucky 1	Kentucky 2	Ohio 1 Southern	Ohio 2 Southern	Ohio 3 Northern	Ohio 4 Northern	Texas 1	Washington State 1
Cost (exclusive of land purchase):													
of shopping center, total	$1,350,000	$500,000	$987,750	$1,035,000	$6,000,000	$1,000,000	$1,500,000	$442,000	$1,162,400	$2,940,000	$804,000	$11,511,000	$8,453,000
of buildings, per sq ft	$8.00	$8.50	$7.78*	$8.625*	$15.00*	$5.00*	$4.85*	$7.48*	$10.80*	$15.00	$12.00*	$12.43	$10.43
per cu ft	$0.52	$1.00	$0.55	$0.784	......	......	......	$0.65	$0.91	......	......	$0.73	$0.65
per lineal front ft	$1,110	$833	$659	$1,137	$2,500	......	......	$762	$1,292	$2,333	$2,297	$1,471	$1,076
of sidewalks, per sq ft	$0.40	......	$0.32	$0.50	......	......	......	$0.45	$0.48	$0.45	......	$0.55	$0.55
of parking area, per sq ft	$0.25	......	$0.278[8]	$0.40	......	......	......	$0.25	$0.22	$0.33	......	$0.53	$0.55
Size: Number of Stores	......	......	20	20	......	30	81	17	32	......	10	......	......
site, acres	13.5	8	34.5	12	33	40	32	4.5	10.6	20	1.5	55	54
floor area, incl basements, sq ft	170,000	42,000	127,000	120,000	400,000	200,000	310,000	59,320	107,800	196,000	66,000	840,000	707,000
sales area, sq ft	125,000	32,000	100,000	108,000	325,000	......	......	31,640	......	156,000	33,000	503,000	425,000
storage & service, sq ft	45,000	10,000	27,000	12,000	75,000	......	......	27,680	......	40,000	33,000	337,000	282,000
store fronts, lin ft	1,216	600	1,500	910	2,400	......	......	580	900	1,200	350	7,100	6,850
enclosed space, cu ft	2,632,300	500,000	1,790,900	1,320,588	......	......	......	687,600	1,293,600	......	......	14,280,000	11,312,000
sidewalks, sq ft	13,360	8,000	20,000	3,500	......	......	......	9,430	14,500	12,000	3,500	180,000	124,800
parking area, sq ft	900,000	180,000	450,000	450,000		20 acre	......					1,792,000	1,856,000
number of stalls or cars	1,500	450	1,200	1,500	2,385	2,000	1,500	535	990	2,000	200	5,120	4,303
Height, % of floor area in													
basements, %	35%	0	18%	✓	✓	0	0	20%	0	30%	50%	37%	33%
1-story buildings, %	65%	......	79%	✓	✓	100%	0	80%	100%	70%	50%	0	2%
2-story buildings, %	0	......	3%	✓	[13]	0	10	0	0	......	......	47%	41%
multi-story buildings, %	0	......	0	......	......	0	0	0	0	......	......	16%	24%
Type of Construction	CB & Br, PC[7]	S, CB	CB & Br, S, PC	CB & Br, S, PC	PC, Br or Mr	Brick	......	CB, PC[14]	CB, PC[14]	PC, S, W	S, PC	S, PC	CB, PC, W[16]
Special features													
covered arcades or sidewalks	......	✓10-ft	✓	✓	✓	✓	......	✓	✓	......	......	✓	✓
enclosed arcades	......	......	......	......	......	......	......	......	✓	......	......	✓	✓
air conditioning	65%	✓	100%	50%	✓	......	✓	✓	✓	✓	✓	✓	......
escalators, how many	2	......	......	......	2	......	......	......	......	......	......	8	5
elevators, how many	......	......	1	......	4	......	......	1 & 2DW	......	......	......	10	6
delivery truck access separated from customer access	✓	✓	✓	✓	✓	......	✓	......	✓	✓	✓	✓	✓
auditorium	......	......	......	......	......	......	......	......	......	......	......	✓	✓
theater	......	......	......	......	✓	......	......	......	......	......	......	......	✓
office building	10 doctors'	......	✓	......	✓	......	......	......	......	......	......	......	......
special landscaping	125 trees	......	✓	✓	✓	......	✓	......	✓	✓	✓	✓	✓
other	......	......	[9]	......	......	......	......	......	......	......	......	[12]	[15]

*CB concrete block   *S steel frame   *PC poured concrete   *TUC tilt-up concrete   *Br brick   *Mr marble   *C customers   *E employees   ** incl site work

[1] decorative sidewalks in central mall, other 3" sidewalks $0.20/sf   [2] with rustic overlay   [3] net, no extras incl   [4] incl extras   [5] wood frame, some post & beam   [6] incl underpass to a store across busy street and site wrrk which account for $740,000   [7] bar joist, metal deck   [8] incl grading   [9] hollow metal doors & frames, firewalls every 100 ft, accoustical ceilings 95%   [10] perimeter of building   [11] also lannon stone facing   [12] medical center & 24-lane bowling alley   [13] construction ample for future 2nd floor   [14] steel joists and beams   [15] medical center   [16] frames & roofs   [17] includes arcades   [18] elevated

Prestressing Expands at Competitive Prices

Challenged on almost every project by long-established structural materials, prestressed concrete is being adopted at an accelerating rate. Reports indicate tendon sales are more than doubling each year. Yet, many times during the past year when prestressed concrete was used, it was selected only after an alternate design in which it was included was bid low.

Latest reports also confirm the trend to pretensioning previously reported in ENR (Feb. 17, p. 80). In pretensioned members, the tendons transfer prestress to the concrete by bond throughout their length.

The tendons are either individual wires or strands. Strands are growing in popularity because larger diameter units can be used—up to ⅜ in.—and still meet bond requirements. With the larger size tendons, the cost of applying a given prestressing force is less than with individual wires, which generally are limited to a diameter of about 0.2 in.

• One type shows most gain—Some idea of the remarkable growth in the use of prestressing may be gained from the fact that two years ago very little pretensioning was used. Now, about 80% of prestressing is being done by the pretensioning method while post-tensioning (prestress transferred through end anchorages) more than holds its own. Thus the increase in prestressing in the past two years exceeds 400%.

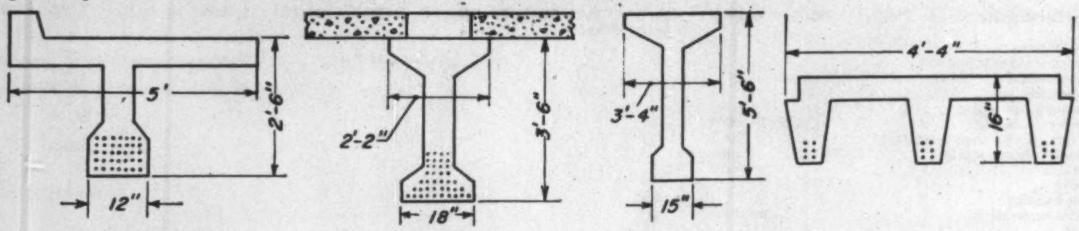
• What does prestressing cost?—Despite the experience gained in recent years, actual costs of prestressed concrete in place are hard to obtain. That is one important reason for the taking of bids on alternate designs with prestressed concrete and other materials. The difficulty is that the actual costs of prestressing for previous projects are usually buried in bid prices for an overall project or obscured by conditions peculiar to the project.

But thanks to Ross H. Bryan, consulting engineer, Nashville, Tenn., and Niels Thorsen, of the Freyssinet Co., New York City, some up-to-date cost data, mostly for pretensioned members, have been isolated. These are presented in the accompanying tables.

H. Kent Preston, of John A. Roebling's Sons Corp., Trenton, N. J., compiled the data in the table on costs of post-tensioning tendons. These costs are not for any particular system of prestressing or project, but for the most economical type of tendon for the given length; they are the prices that might be expected in competitive bidding open to all prestressing methods now in common use.

Included are material costs, freight charges and costs of placing, tensioning and grouting—plus 20% for contractor's overhead and profit. Costs in the table are based on jobs with 50 tons or more of wire or strand. A smaller project, requiring, say, 10 tons, might run 10% higher. The figures given are for tendons capable of ap-

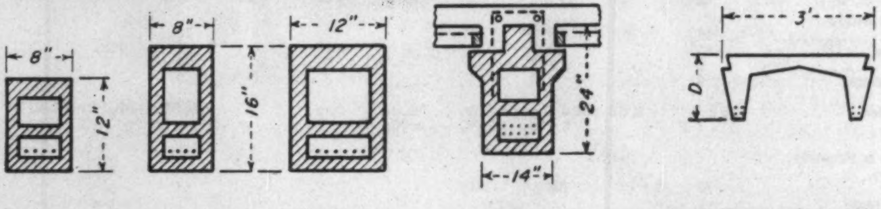
Cost of Simple-Span Pretensioned Members with Deflected Strands†



Where used	**Bridge**	**Bridge**	**Roof***	**Bridge deck**
Span, feet	82	84½	100	35
No. of ⅜-in. strands	28	40	24	20
Cost per lineal foot, f.o.b. plant	$25.00	$14.00	$30.00	$8.67
Delivery & erection, per lineal foot....	$10.00 (40 mi.)	$3.50 (5 mi.)	$18.00 (150 mi.)	$1.08 (5 mi.)

†Designed by Ross H. Bryan, fabricated by T. L. Herbert & Sons, Nashville, Tenn. *Fabricated in three sections and post-tensioned on the site with five cables, each with twelve 0.276-in. wires.

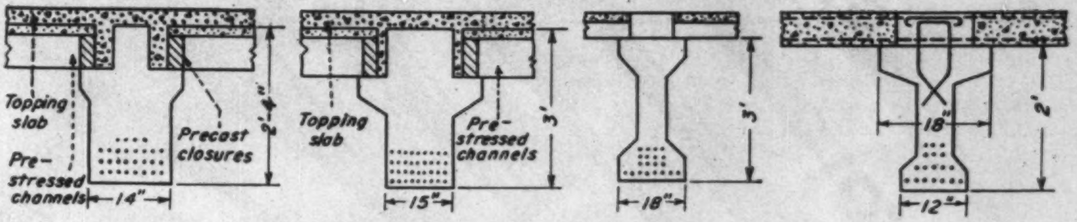
Cost of Prestressed Block Beams and Roof Channels†



Span, feet	20	25	20	25	22	26	35	45	50
Cross section, inches	8x12	8x16	12x16	14x24	6x36	8x36	10x36	12x36	14x36
No. of ⅜-in. strands.	4	6	8	10					
Cost per lineal foot, f.o.b. plant	$1.30	$1.70	$2.50	$4.50	$1.80	$1.95	$2.16	$2.37	$2.55
Delivery & erection, per lineal foot....	$0.15	$0.20	$0.25	$0.50	$0.12 to $0.18				

†Designed by Ross H. Bryan, fabricated by Nashville Breeko Block Co., Nashville, Tenn.

Cost of Continuous Pretensioned Beams with Deflected Strands†



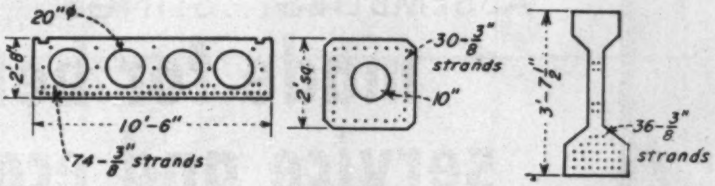
Span, feet	32	40	62*	50
Cross section, inches	14x28	15x36	18x36	18x24
No. of ⅜-in. strands.	28	36	20	18
Cost per lineal foot, f.o.b. plant	$11.00	$15.00	$13.00	$10.00
Delivery & erection, per lineal foot....	$0.50	$1.00	$1.50	$0.50

†Designed by Ross H. Bryan, fabricated by T. L. Herbert & Sons, Nashville, Tenn. *Part of a rigid frame.

Cost per 10-Kip Stress for Post-Tensioning Tendons

Length in feet	Total cost	Cost per ft.
25	$ 5.55	$0.222
50	8.40	0.168
75	10.80	0.144
100	13.10	0.131
150	18.90	0.126
200	24.00	0.120

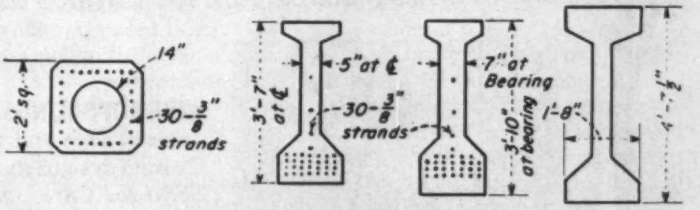
Cost of Prestressed Concrete for Pelican Islands Bridge† (Galveston, Tex.)



How used	Railroad slabs	Pile	Pretensioned stringers
Span feet	25	*	50
Cost per lineal foot, in place	$70.08	$12.10	$12.18

†Designed by Parsons, Brinckerhoff, Hall & Macdonald, fabricated by Whittle Construction Co., Dallas, Tex. *Total — 61,480 ft.

Cost of Prestressed Concrete for Hampton Roads Bridge†



How used	Piles	Pretensioned girders	Post-tensioned girders**
Span feet	73*	50	80
Cost per lineal foot, in place	$7.50	$8.28	$12.50

†Designed by Parsons, Brinckerhoff, Hall & Macdonald; fabricated by Merritt, Chapman & Scott; prestressing yard designed by Freyssinet Co. and Precrete, Inc. *Estimated average length; total, 43,000 ft. **Subsequently dropped from project.

plying a 10,000-lb prestressing force after all losses due to shrinkage and creep have taken place. To obtain costs for other prestressing forces, multiply figures in the table by one-tenth the actual force in kips.

Thorsen estimates that the cost of most post-tensioned structures falls within the range of $125 to $135 per cu yd of concrete.

Costs of post-tensioning with high-strength bars are averaging around $0.25 per lb, plus labor at $0.05 per lb, according to J. Nelson Hicks, vice president, Stressteel Corp., Wilkes-Barre, Pa. He estimates that the girders and deck slabs for the Gandy Bridge at Tampa, Fla. (ENR Nov. 11, 1954, p. 26), cost $3.62 per sq ft for 48-ft spans and $6.95 per sq for 72-ft spans. Deck slabs are 7 in. thick. In the 48-ft spans, there are four 40-in.-deep, I-shaped girders per span, each prestressed with four 1⅛-in. bars; and in the 72-ft spans, there are six 4-ft-deep girders per span, each prestressed with six 1⅛-in. bars.

Current mill prices for the strand used for the pretensioned members listed in the accompanying tables are in the neighborhood of 20 cents per pound. Freight from mill to fabricating plant seldom exceeds 1¼ cents per pound. Cost for placing and tensioning is about ½ cent per linear foot of strand. When several members are fabricated simultaneously, an added allowance of about 5% is generally necessary for the extra distance between members in the casting bed and at anchorages and jacking points.

In estimating the cost of pretensioned members, contractor's overhead and profit also must be added to the above costs, plus an allowance for depreciation of plant. Preston estimates that the selling price of pretensioned members usually ranges between $70 and $80 per cu yd.

Nearly all pretensioning plants are producing members with a minimum 28-day strength of 5,000 psi. The ⅜-in. strands used have an ultimate strength of 20,000 lb; they are tensioned to a maximum of 14,000 lb, the design load being 11,200 lb.

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Pittsburgh 19, 704 Second Avenue
Chicago 6, 228 S. Desplaines Street
St. Paul [illegible]
Fort Worth 1, P. O. Box 605
Portland 9, 1603 N.W. 14th Avenue
Seattle 4, 87 Holgate Street
San Francisco 7, 141 King Street
Los Angeles [illegible]

Large-Scale Experimental Atomic Power Plants in U. S.

Client & Location	Type	Designer & Builder	Estimated Completion Date	Output Elec. KW	Estimated Cost	Unit Cost Per Installed KW
Duquesne Light Co. and AEC Shippingport, Pa.	Pressurized water	Westinghouse Elec. Corp. Stone & Webster	1957	60,000(1)	$85 million(1)	$1400(1)
Detroit Edison Group Monroe, Mich	Fast breeder	....	1959	100,000	$54 million(2)	$540(2)
Nuclear Power Group (Commonwealth Edison Co.) near Joliet, Ill.	Dual-cycle boiling water	General Electric Co. Bechtel Corp.	1960	180,000	$45 million	$250
Consolidated Edison Co. near Peekskill, N. Y.	Pressurized water	Babcock & Wilcox	1959	236,000(3)	$55 million	$233
Yankee Atomic Electric Power Co., Rowe, Mass.	Pressurized water	Monsanto Chemical Co. Fluor Corp.	1958	100,000	$25 million	$250
Consumers Public Power District, Columbus, Neb.	Sodium graphite	North American Aviation, Inc.	1959	75,000	$20 million	$267
Pennsylvania Power & Light Co.	Homogeneous breeder	Westinghouse	1962	150,000	....	....

(1) Shippingport's output may reach 100,000 KW. This would reduce installation cost per KW to as low as $850. Furthermore, the amount of investment in research and development is very high, making comparison between this and costs of traditional plants almost meaningless.

(2) Detroit Edison's reactor costs also include huge outlays for research and development of the fast breeder, an advanced design.

(3) Of this, 140,000 KW comes from the reactor and 96,000 KW from an oil-fired superheater.

Atomic Power Plants—

Costs a Long Way From Competitive

Atomic power in the U. S. is starting to move this year from small-scale experimental reactors toward the full-scale developmental stage. Construction has begun on the first big power reactor—the 60,000-to-100,000 KW plant being built for Duquesne Light Co. and the Atomic Energy Commission at Shippingport, Pa.

Though a large-scale plant, Shippingport is still very much of an experiment. Its cost is estimated at $85 million, of which about $38 million is for the reactor, about $10 million for the generating section, and the rest for research and development. However, these figures cannot be considered as firm. The principals involved point out that one of the main reasons they are building the reactor is to provide a firm basis for estimating costs.

• **Many factors**—Philip A. Fleger, Duquesne's board chairman, recently had this to say about his atomic baby:

> "In developmental plants such as Shippingport, construction costs will reflect the cost of many things which have been embodied in the plant for research and development. The relatively high cost of components manufactured on a tailor-made or non-tooled basis will also be a distorting factor. True construction cost values will be further obscured by subsidies from firms desiring to be associated with the projects for the purpose of gaining knowledge and prestige. Initial operating expenses will be inflated by manpower costs which will reflect lack of experience, insufficient knowledge of safety requirements, and test work . . .
>
> Therefore the actual cost of electricity produced by developmental plants such as Shippingport will be of no significance whatsoever. On the other hand, with the knowledge gained from the construction and operation of these plants it will be possible to estimate the cost of constructing and operating plants of the same type on a non-developmental basis . . . These estimates will present some difficult questions, especially as to the life of various elements in the reactor portion of the plant and the proper amount to be set aside each year for their depreciation. But reasonable accuracy should be attainable after several years' operating experience. Any estimates made prior to this will have to be based upon many arbitrary assumptions and will be in the nature of guesswork."

The Shippingport plant is not scheduled to start test operations until 1957, and Fleger says it's a tight schedule. That gives you an idea of how long it will take to get firm data on A-plant construction costs in this country. The cost estimates for other projected plants in the table (above) should be read with this important qualification in mind.

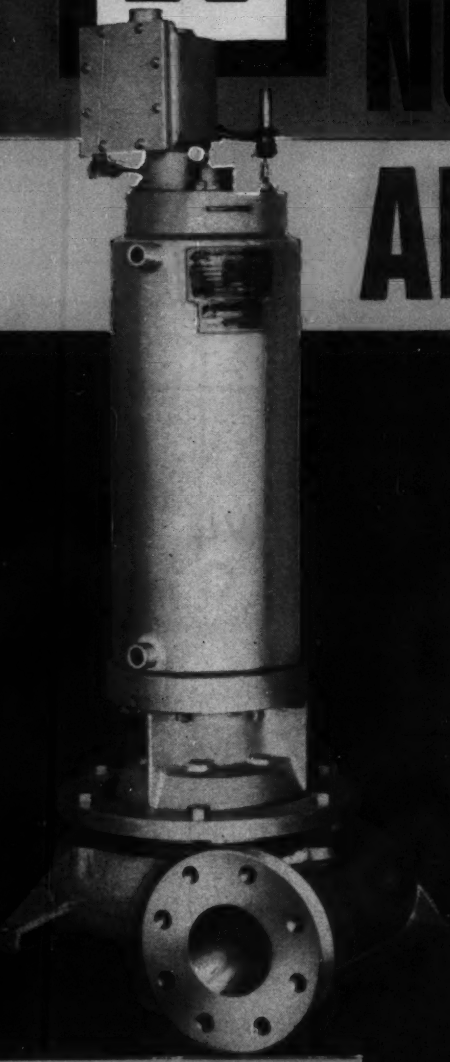
But as you study the table, you will see a rapid decrease in estimated costs of construction per installed KW, for U. S. projects proposed since Shippingport was announced early last year. These estimates indicate that, on paper at least, rapid advances are being made in nuclear technology.

• **Foreigners first**—Incidentally, Shippingport will not be the first big A-plant. The British have the first of a whole string of central station plants scheduled to go into operation next year. And the Russians claim they will also have one going in 1956.

However, though the Americans may not be the first in the field, they are certainly going to offer variety. In August, AEC approved proposals of two private groups to go ahead with large-scale reactors. One is the 180,000-KW plant that the Nuclear Power Group, headed by Commonwealth Edison Co. of Chicago and including Bechtel Corp. of San Francisco, will build in the Chicago area. This one will be owned by Commonwealth Edison and partly financed by the others in return for experience.

The other project is a 100,000-KW plant to be built near Detroit by a group of 23 companies headed by Detroit Edison Co. The members will own their plant jointly, with Detroit

PUMPS FOR NUCLEAR APPLICATIONS



FIVE BASIC APPROACHES to nuclear fluid handling have been developed. Four are "zero leakage" types: (1) the canned motor pump; (2) the submersible motor pump; (3) the gas filled motor pump; and (4) the oil filled motor pump. These four types employ special electric drive motors close-coupled to the pump with the entire unit hermetically-sealed. The fifth approach, a "controlled leakage" type, uses a mechanical seal to confine leakage along a shaft driven by standard electric, gasoline or diesel motor or steam turbine.

Byron Jackson Co.'s Nuclear Section offers unusual advantages in all nuclear pumping approaches. Not only is Byron Jackson an experienced producer of all nuclear pump types, but BJ is the only company which designs and manufactures all three major elements: pumps, special pump motors, and high precision mechanical seals. Since 1872 BJ has held leadership in engineered pumps. Since 1936 BJ has pioneered in specialized pump motor design. Since 1940, BJ has set the pace in mechanical seal development. BJ originated two of the parent nuclear pump designs . . . the mercury-sealed submersible motor pump in 1936, "grandfather" of canned nuclear pumps . . . and the stuffingboxless pump developed in 1945, "father" of the basic canned pump design.

Whatever your radioactive fluid problem or other nuclear pumping requirement, talk to Byron Jackson Co. nuclear scientists and engineers *first*.

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Nuclear Pumps

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Edison buying the steam. At the time of writing, action was still pending on an application by Consolidated Edison Co. of New York for an even bigger plant (see table) near Peekskill, N. Y., to be financed by the owner. Recently Pennsylvania Power & Light Co. applied for a privately-financed plant, to produce "at least 150,000 KW."

The experience at Shippingport will help to firm up cost estimates for other reactors, though all but the Peekskill project are of different types.

What are these various types of reactors, and how do they differ from each other? To answer that, we must review the general engineering problems of any power reactor.

• **General problems**—In the first place, as many as possible of the neutrons released by fission must be absorbed by neighboring fuel atoms, to insure a chain reaction and conserve this expensive fuel. Some reactors use "fast" neutrons, emitted at a speed of 10,000 miles per second. Others employ a slowing-down material, called a "moderator." In addition, the structural materials that are used in the reactor must have a low capacity for absorbing neutrons.

Next, the designer must keep in mind that constant neutron bombardment of the structural materials causes changes in their properties. And of course the whole reactor structure must be surrounded by a shield that protects the operators from radiation. Replacements of parts inside the reactor must be done by remote control.

Energy (in the form of heat) having been produced, the next problem is to transfer it to steam in the turbogenerator. There are many different possible ways of doing this.

And there are two other problems which have to be solved before commercial A-power is possible: (1) How do you keep the reactor from getting so hot it melts, spouting radioactive material into the air? (2) At intervals, the fuel elements used in some reactors must be taken out to be reprocessed. This is a very expensive process. Can it be done economically or avoided altogether?

• **Pressurized reactor**—Here's how the Shippingport reactor is designed to solve these problems. This is a pressurized-water reactor. Water (kept under heavy pressure to prevent it from turning to steam though it is several times the normal boiling point) circulates around the fuel inside the reactor, acting as a moderator and absorbing heat. This pressurized water flows through a circuit between the reactor and the heat exchanger. Here, without passing on its radioactivity, it transfers heat to water in a separate circuit. This water, turned to steam, operates the turbogenerator.

There are four other major reactor possibilities, and all but one of them has a very different method of transferring the heat of nuclear fission into electric power. Commonwealth Edison's plant near Chicago—to be called the Dresden Station—is a dual-cycle boiling water reactor. This needs no heat exchanger. It provides a circuit where radioactive steam comes directly out of the reactor to operate the turbogenerator, and also a secondary circuit that provides boiling water which "flashes" into steam in case of a sudden increase in demand for power.

• **Fast breeder**—A very different approach is the fast-breeder reactor, to be used by the Detroit Edison Group. This would create more fuel than it consumes. That is, the neutrons produced by fission of U-235 atoms would convert the U-238 atoms which are also present in uranium to plutonium (itself a fine atomic fuel). And there would be more plutonium atoms produced than U-235 and plutonium atoms consumed. In this reactor, the heat energy produced by the fission of U-235 atoms would be carried to the heat exchanger by liquid sodium, a metal. Molten metal would pass through the water-filled heat exchanger in a closed circuit, turning water into steam for the turbogenerator. The plutonium atoms produced would be removed periodically from the reactor for use as fuel or for military purposes.

Still another type of reactor—in the opinion of many experts the most promising of all—is the homogeneous breeder. This is the type Foster Wheeler Corp. believes it can install for $210 per kw. This eliminates the expensive periodic replacement of the fuel element, substituting a solution of uranium in heavy water which can be continuously reprocessed by a chemical plant adjoining the reactor.

• **Homogeneous breeder**—Inside the reactor, the uranium solution flows within a core that is surrounded by a slurry of thorium and heavy water. This slurry does two jobs: (1) It absorbs heat from the reactor core and passes through a heat exchanger where the heat becomes steam for the turbogenerator. (2) The slurry acts as a "blanket", producing more fuel in the form of U-233, which is continuously drawn off by another adjoining chemical plant.

This is not all. The uranium solution in the reactor core, which is radiating neutrons into its surrounding blanket, also passes in a closed circuit through its own heat exchanger, producing more steam.

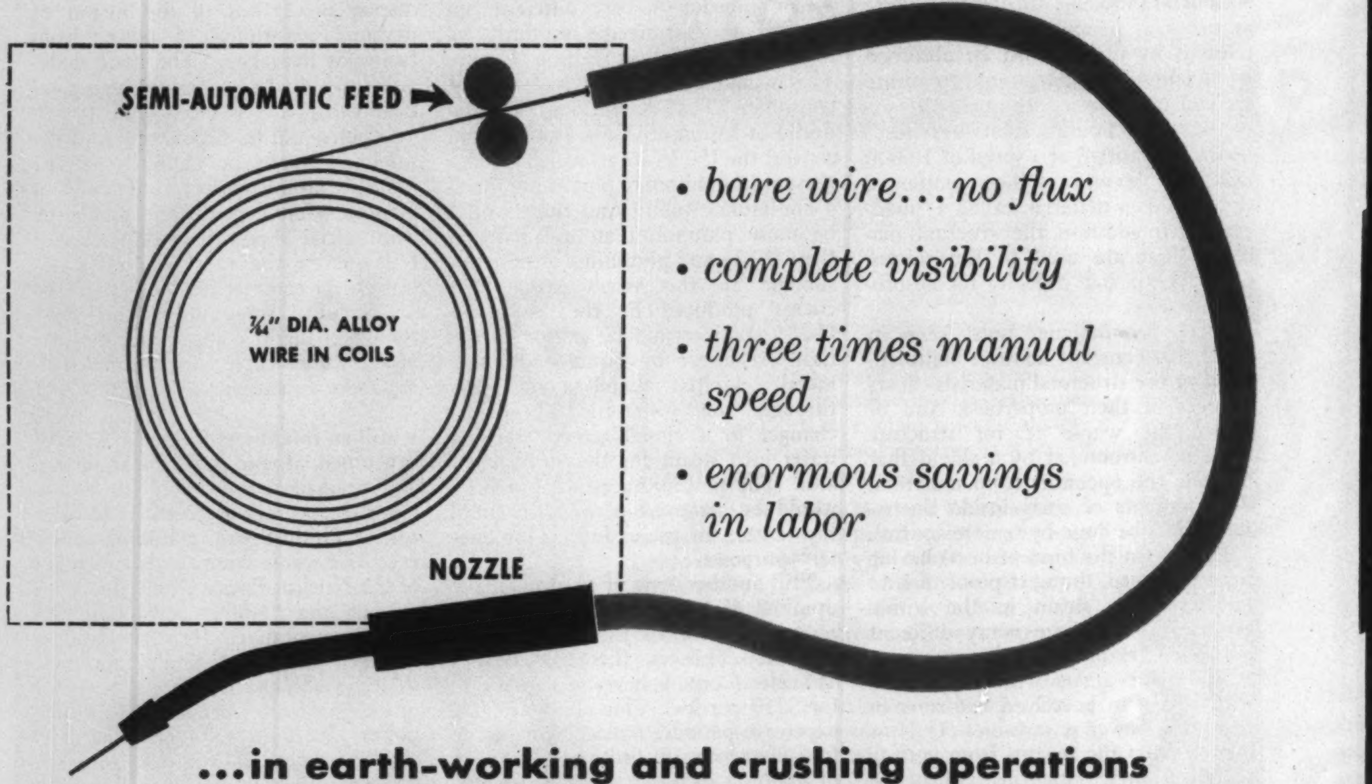
• **80 ways**—These are the main types of reactors now under construction. More advanced types are being studied. Last year, AEC noted that there are "perhaps 80 or more" ways of converting atomic energy into electric power. By next year's Cost Issue, ENR's table of nuclear central stations may show lower estimates per installed KW. It may not be until 1957, however, that ENR will be able to provide detailed unit costs based on actual experience.

By that time, it is possible that all A-plants then under construction will be already obsolete, as new types are developed. And within a few years, experiments might shift from producing power out of the fission of uranium to studies of power from fusion of hydrogen. The basic material—heavy hydrogen—might be a good deal cheaper. There would be no radioactive ash to dispose of. And the shielding might be lighter. At last month's atomic power conference in Geneva, some experts were predicting commercial H-power by 1975. As of today, even the most optimistic do not expect commercial A-power in the U. S. until sometime after 1962—though it might come earlier in parts of the world where conventional fuels are more expensive.

• **Still an infant**—As far as the U. S. is concerned, atomic power for industrial and residential use is still in its infancy. It has serious obstacles to overcome. Philip Sporn, a leading utility executive whose company is a member of the Nuclear Power Group, has tried to put the "atomic revolution" in proper perspective. He is sceptical of the idea "that from Shippingport we shall be able to leap by a series of quick jumps to economical atomic power . . . I do not mean that it is wholly impossible, but it is going to be very difficult, and it will take a great deal of engineering development to approach it."

Meanwhile, as atomic power gradually gets more economical, conventional methods of power generation are getting more efficient too. As Sporn has expressed it, the developers of the atom "are shooting at a moving target." Sporn believes that the great majority of the U. S. plants built in the next 15 years will still use conventional methods. Right now, installed generating capacity is about 100,000,000 KW. "By 1970, when our overall national requirements for electric power will be around 275,000,000 KW, I would not expect the proportion of nuclear power to be as much as 10,000,000 KW."

SEMI-AUTOMATIC with the NEW Alloy Tubular



- *bare wire...no flux*
- *complete visibility*
- *three times manual speed*
- *enormous savings in labor*

...in earth-working and crushing operations

This is a totally new hard-facing method utilizing the welding speed of the semi-automatic machine to produce sound deposits of wear-resistant alloys. The wires run bare, using no flux, so that the weldor enjoys full visibility at all times...deposition rates at normal welding currents (200 to 300 amps) are double or triple those of the manual method...standard semi-automatic equipment is easily converted to handle Stoody wires.

Maintenance time and welding costs are reduced through increased service life provided by Stoody alloys and the greatly increased welding speed. Weldors like the semi-automatic, find it easy to operate with less fatigue.

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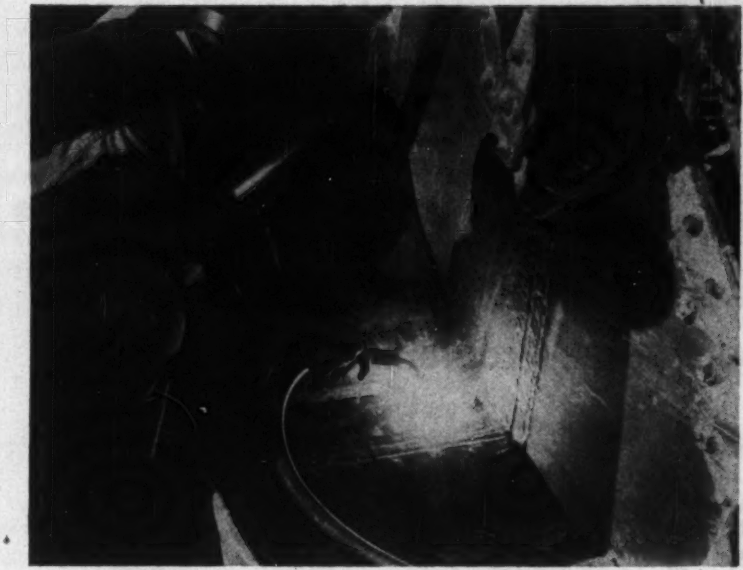
HARD-FACING

Stoody Wires



SHOVEL BUCKETS: TEETH, LIPS, ADAPTERS, ETC., *Stoody 121 gives good wear resistance, quickly covers wearing areas on this clamshell and other types of buckets.*

Stoody 100...a high chromium alloy wire for equipment subject to severe abrasion and impact. This is similar to Coated Tube Stoodite. Used on crushers, buckets, rippers, augers, tool joints. Deposits 10 to 18 pounds per hour.

Stoody 121...a medium alloy material with excellent resistance to abrasion and impact. This is similar to Stoody 21. For bucket teeth, shovels, grizzlies, loader lips, crushers. Deposits 9 to 16 pounds per hour.

Stoody Nickel Manganese...produces a Hadfield manganese deposit for build-up of all manganese parts—crushers, buckets, shovels, teeth—preparatory to hard-facing. Deposits 4 to 7 pounds per hour.

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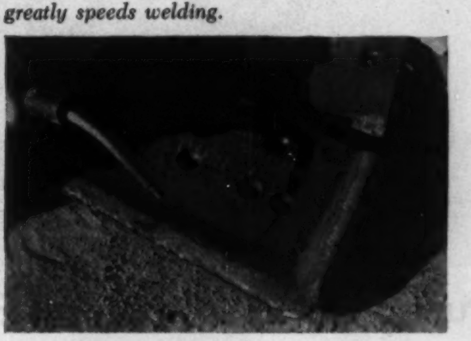
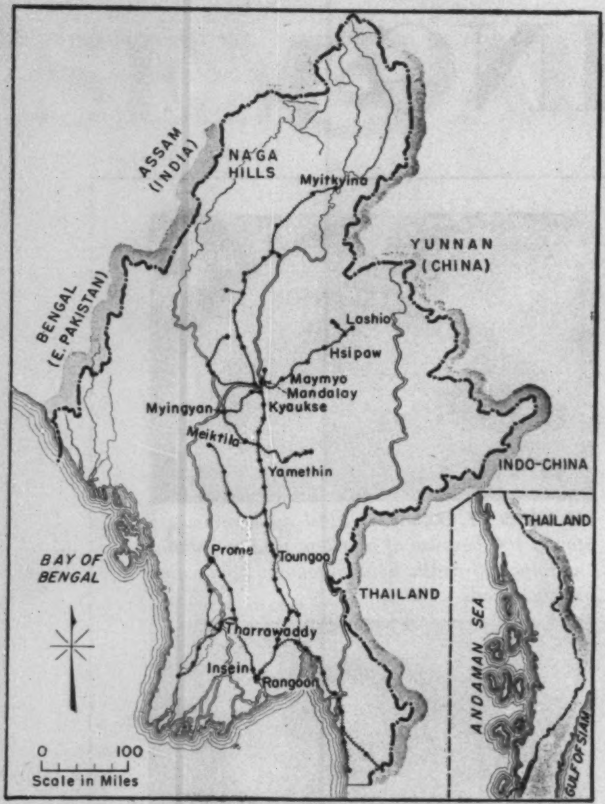
ALL TYPES OF CRUSHERS: *Ideal applications for Stoody 100 because of excellent wear resistance and impact strength. Semi-automatic application greatly speeds welding.*



BULLDOZER END BITS: *Can be hard-faced in one third of time required by manual process. Stoody 121 is recommended.*

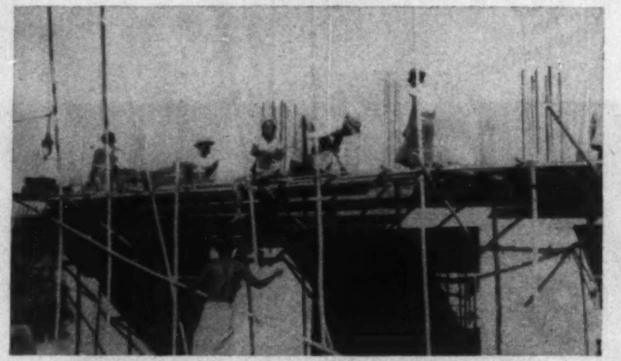
SCRAPER BLADES: *Parallel beads of Stoody 121 are fast and easy to apply to scraper blades, add excellent wear resistance.*

SHOVEL TRACK PADS: *Use of Stoody Manganese applied by semi-automatic welder cuts time on maintenance.*



BURMA'S RIVER AND RAIL transport system.

STOCKPILING at the site in Burma.



MOVING MATERIALS to job by aerial route.

Construction Prices Point Up Engineering Problems

High on the list of problems that American engineers run into when they work on development programs in other countries are scarcity of basic planning data, inadequate transportation facilities, differences in construction materials and construction methods. The minor problems include differences in units of measure and in the monetary units for judging prices and costs. Many of these are illustrated in the prices shown here.

Burma's Pyidawtha program (long-range program for economic and social development) was drawn up for the Burmese government and is being directed by Tippetts-Abbett-McCarthy-Stratton, consulting engineers of New York. Ben Robinson, assistant to their chief planning engineer in Rangoon has assembled the materials prices and wage rates shown here and in addition the unit prices on the British-built bank building in Rangoon.

Since the Pyidawtha program has stepped up construction activity Burma's material and labor prices have been rising and continue to do so.

Generally speaking, local skilled labor is scarce and has to be imported for sizable projects. Rates and "fringe" benefits for workers from India are shown. Unskilled labor is available except during planting, cultivating and harvesting seasons.

But the big problem is the high cost of transportation—by boat, rail, truck, ox-cart. The cost of getting a tractor from the port of entry to where it is needed can be as great as the original purchase price. The cost of steel in the Naga Hills area is four or five times its cost at Rangoon with transport to Mandalay responsible for three quarters of this differential. Access by rail or river is limited to the central area.

Good aggregates for concrete are scarce. Broken or crushed brick and shingle gravel or chips predominate. The latter is a flat stone that breaks up in planes. Sand is of uniform size without the gradations that reduce interstices.

Laterite a red, iron-bearing stone, not rich enough to qualify as ore, makes good self-binding road metal.

Local brick is of poor quality and low cost, $20/M. When used in walls a coat of ½-in. to ¾-in. plaster or stucco is applied over it, then this is whitewashed. Both white and color washes are widely used but white is on the long side of a 95-5 use ratio.

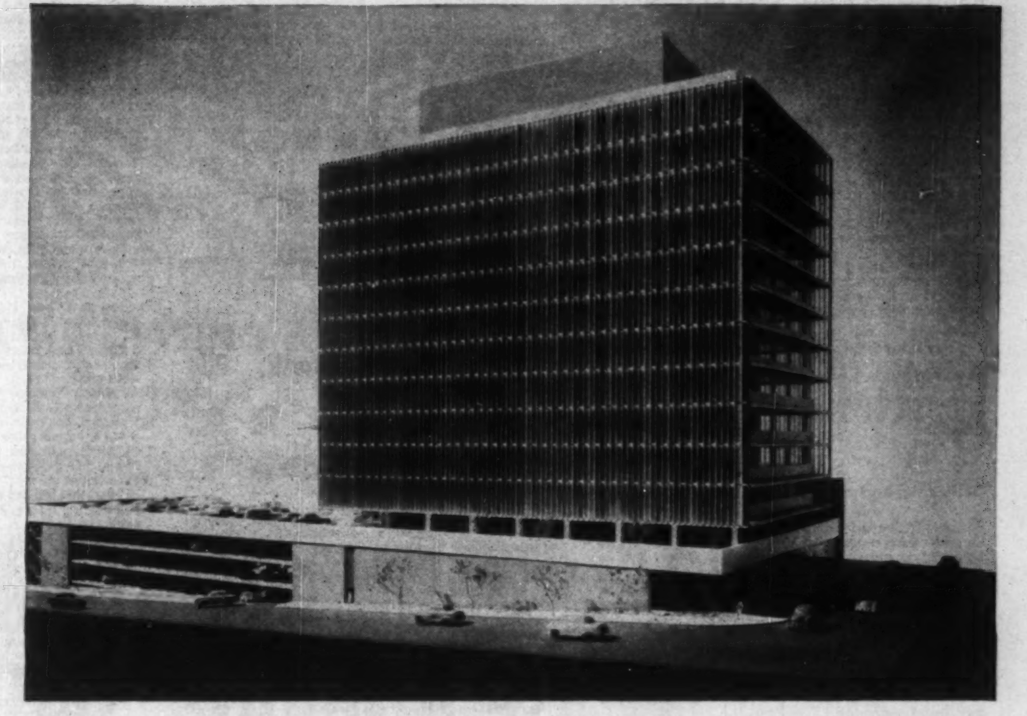
Plastering is still a fine art in Burma. Note the moulded, projected and raised plastering in the unit prices shown for the new Burmese National Bank Building.

Steel prices are rising. Reinforcing steel has recently gone up £3/ton from Japan and £5/ton from Belgium. All steel is imported.

Jungle wood includes bamboo which is widely used. Teak is the most popular wood for doors, windows and interior finishes. It takes six years to process from the time the tree is ringed until it is delivered to the mill. This time is increasing and prices are rising due to a "tax" imposed by insurgents to permit logs to pass through the river. An active program is underway to develop and popularize other of the many excellent woods available in Burma.

In the prices that follow differences to look for include these pricing units: 100 sq. ft., 100 cu. ft, long tons, the running foot where lineal foot is used here, the sadram (10'x10'x1'). Burma's Department of Public Works defines a concrete mix as 1:2:4 but the British builders call it 4:2:1. The Department of Public Works is doing an excellent job of developing basic construction cost data for various classes of work in place, for dismantling and for reclaiming materials.

3325 WILSHIRE BUILDING, *Los Angeles, California*
OWNER AND BUILDER: *Tishman Realty and Construction Co., Inc.*
New York and Los Angeles
ARCHITECT: *Victor Gruen, A.I.A., Los Angeles, New York and Detroit*



serving the architect, and owner-builder

with metal wall engineering and production quality

This new 13-story office building will be completely air-conditioned. To admit maximum natural light without the discomfort of glare and direct sunlight, the building has been designed with projecting horizontal sunshades on the south and north elevation, and vertical louvers on the east and west elevation. The complete aluminum wall framing and vertical louvers will be Kawneer engineered and produced, saving the architect and builder months of time and giving them the assurance of client satisfaction. Special Kawneer weather-tightness plus expansion and contraction features will be included.

Have you a metal wall problem? Why not delegate the whole responsibility to Kawneer. Five plants in the United States and Canada, a complete engineering staff, and 50 years of experience in architectural metals are waiting to serve you.

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Prices are shown here in Burma's new kyat (K), pronounced chaht, which replaced the rupee in 1954. With 100 pyas to the kyat, it is easy for Americans to use. Officially K4.76 = $1.00 U. S. or Kl = $0.21.

Wage Schedules, Burma

Actual costs, local labor, December, 1954

Skill	K/day	$/day	$/hr
Common labor	2.50	0.53	0.07
Concrete laborers, Bricklayers, Carpenters	6.00	1.26	0.16
Plumbers, Electricians	8.00	1.68	0.21
Power equip. operators & maint. men	15.00	3.15	0.40
Steel workers	12.00	2.52	0.32
Metal lathers	8.00	1.68	0.21
Welders and blacksmiths	8.00	1.68	0.21
Light equipment operators	6.00	1.26	0.16

Foremen, (monthly employees, received approximately 1–1/2 times the daily rate of the skilled labor they supervised Burmese nationals are paid for 14 holidays, 10 days casual leave, 30 days sick leave and 26 Sundays)

Common labor, foreman	5.00	1.05	0.13
Concrete, Bricklayer, Carpenter	9.00	1.89	0.24
Electrician	12.00	2.52	0.32
Steel worker	18.00	3.78	0.58
Metal lather	12.00	2.52	0.32

Skilled labor from India

	K/mo*	$/mo
Carpenters, Electricians, Steel workers	321.00	67.50
Carpenters apprentices	213.00	44.80
Foremen, carpenter	375.00	79.00

*rates are pro-rated to incl 1 month salary per year in lieu of vacation, plus K600 for round trip fare from India—monthly rate is base rate × 13/12 + 600/12

Foremen who are Indian nationals, monthly employees, are paid for 14 holidays, 10 days casual leave, 30 days sick leave, 30 days vacation, 52 Sundays

Labor rates for contract work—July 30, 1955, per head per day

Carpenters, plasterers, steel benders, structural steel men		K10/-
Bricklayers, concrete masons		K9/-
Coolies	male	K4/-
	female	K3/-
Foremen		K500–800/month

Materials Prices, Burma

December, 1954

Material	Burma Unit	Unit Cost	U S Unit	Unit Cost
Sand, (100#/cf*) 10-mi haul	100cf	K 30	t	1.25
asd		K18–25		
Crushed stone, ⅛" to ½"	100cf	K280	t	10.60
(3,000#/cy*) ½" to 1"		K260		9.83
1" to 2"		K210		7.94
River gravel (2,800#/cy*)	100cf	K135	t	5.48
Laterite (100#/cf*)	100cf	K 50	t	2.10
Cement, shipload lots, barging not incl....asd	L t	K170	t	31.90
Struct steel, contract price	cwt	K 40	cwt	7.46
Reinf steel, contract price	cwt	K 50	cwt	[1]9.37
Bitumen, small quantities	L t	K407	t	76.40
shipload lots	L t	K240	t	45.10
Struct timber, Jungle	Mbm[2]	K350	Mbm	73.60
Pyinkado		K525		110.40
Teak		K750		157.80
Concrete drain pipe, 18"	lf	K 25	lf	5.25
24"		K 30		6.30
36"		K 40		8.40
48"		K 50		10.50

Contract prices, in place

Concrete, Cl A, 1:2:4	cy	K150	cy	31.50
Cl B, 1:3:6		K 95		20.00
Cl C, 1:4:7		K 75		15.76
Plaster, 3 coats	sy	K4.50	sy	0.95
Welding, 3-pass	lf	K 3	lf	0.63
Premix, 2" carpet	sy	K 15	sy	3.15

* assumed [1] $8.03, cost from Japan [2] all structural timber is bought by the Long ton, arbitrary assumption here, despite specific gravity, is that 1 Lt = 600 bf

Material Prices for Contract Work, 7/30/55

Material	Unit	Price
Struct lumber, Junglewood scantlings	t of 50cf	K280/-
boards		K290/-
Teak for doors and windows		K850/-
Steel, reinf, M S round bars	t	K1,100/-
struct, RSJ and angles	t	K1,200/-
Brick, local	M	K 87/-
Glass, imported, 24-oz	sf	K1.50
Sand 10' x 10' x 1'	sadram	K 28/-
Gravel, river shingles	sadram	K120/-
Granite stones, stone chippings	sadram	K225/-
Road metal	sadram	K200/-
Granite block, road base, 6" to 9"	sadram	K175/-
Cement	t	K180/-

Unit Costs of Burmese National Bank, 1954

Item	Unit	Rate in Kyats
Clear site, incl remov exist floor & wall	ls	1,500
Excav, earth cols & wall foundations, incl part backfill, watering, ramming, temp timbering, bailing	Ccf	7.00
Cement conc, 6:3:1 with 1½" brick aggr	Ccf	245.00
to foundation		
to col base, incl all temp forms	Ccf	260.00
Brickwork, 4:1 cmt mortar, Thamaing brick, to foundation up to plinth	Ccf	225.00
Cement conc, 1½", 4:2:1, fine shingle aggr & 5% Pudlo laid for dampproof course	sf	1.00
Sand fill to floor, 6" layers, watered & rammed to received conc floor	Ccf	37.00
Brickwork, 1st class, 4:1 cmt mortar, Thamaing brick, all quoins, perpends, English bond, joints raked min ¼" deep to	Ccf	235.00
same in 6:1:1 composite mortar 1st to 2nd fl	Ccf	230.00
same, 2nd to 3rd floor level	Ccf	242.00
same from 3rd fl to roof and par walls	Ccf	260.00
Partition wall, 4½" reinf brick, 1st class Thamaing brick, 4:1 cmt mortar reinf with Exmet every 4th course	Csf	125.00
Sub-floor, 4½", 6:3:1 cmt conc, 1" brick aggregate laid to ground floor	Csf	95.00
Ground floor, 1½", 4:2:1 cmt conc with fine shingle aggr laid in squares, trowel finish in 2:1 cement mortar	Csf	70.00
same, finish with Terrazzo, colour, desine, polish, complete	sf	5.50
Terrazzo ½" skirt 12" high to match floor, incl ¾" backing in 3:1 cmt mortar, polish	rf	6.50
Floor slab, reinf 4½" 4:2:1, shingle aggr reinf with BRC#9 incl tension strips, finish smooth with 2:1 cmt mortar, 1 operatn	Csf	312.00
Cement conc, 1½" shingle aggr 4:2:1 finish wth Terrazzo to step incl forming nosing	sf	7.50
Cement plaster to ceiling, 3:1	Csf	45.00
Waterproofing to portico roof slab with 2 layers mastic & blinded with fine gravel	sf	1.25
Composite plaster to wall, ¾", 6:1:1	Csf	35.00
Encase RS beam 12" x 6" & 9" x 4" with brick in 3:1 cmt mortar incl BB lathing to bottom flange & plastered, complete	rf	2.75
Plastered moulded frieze, 4½" project 12" wide at 1st floor level, Xtra over plastr	rf	3.25
architrave, incl brick core, 9" x 4½"	rf	3.50
cap to cols, incl brick wall, 6" x 4½"	rf	3.00
base to cols, incl core, 3", 12" high	rf	5.00
Raised plaster, ½" in 6:1:1 at 1st fl level extra over ordinary plaster	Csf	38.00
Plaster parapet mould to portico parapet incl brick core	rf	3.00
Plastered projected moulded sill, 6" x 1½", to windows incl brick core	rf	2.00
frieze 4½" x 3" mould at roof	rf	2.50
parapet coping, 6" x 3"	rf	2.50
Provide in mortar & paint raised characters to read "The Burmese National Bank" in Burmese & Roman characters	ea	200.00
RCC lintel in brick aggregate ¾", 4:2:1 reinf with 1% MS rod	cf	6.50
RCC in shingle aggr 4:2:1 reinf with BRC#9 incl 4½" landing & 1½" fine shingle conc finish to tread with 1½" x ¼" projected nosing & 3:1 cmt plaster to riser & soffit of stair	sf	8.00
Reinf brick rail to staircase balustrade 3", 3'-6" high, plastered both sides, incl 6" x 1½" teak moulded handrail, incl all bends. Shellac polish to wood, 3 coats of colour wash to plaster	rf	11.75
Wood counter, 1st cl teak 3' x 3'–6" high, teak paneled front, utility drawers every 6' incl frames on brick wall 4½" wide, Terrazzo skirt, shellac polish	rf	95.00
WI rail 1½" high on top of counter ½" x ½" sq rod and 1½" horiz, 3 coats oil paint	rf	20.00
Brick rail, 4½" 3'–6" high, at Mezzanine incl 5" x 1½" teak moulded handrail, complete with plaster & polish	rf	10.00
Windows, metal front, incl 3 coats oil paint	sf	18.25
1½" teak, glazed, incl 4" x 3" teak frame complete with iron furniture & 18-oz plain glass	sf	7.00
Paneled door, teak 1½" incl 4" x 3" teak frame & iron furniture, full panel	sf	7.25
Teak panel & glazed partition, 1½" with necessary teak framing, collerox glass	sf	8.50
Teak panel & glazed swing door, 1½" collerox glass	sf	8.50
Steel plated windows, $\frac{1}{16}$", 2" x 2" x ¼" L angle iron frames & 3 coats oil paint	sf	13.00
MS plate sliding door with angle iron frame & top & bottom roller, 3 coats oil paint	sf	13.50
Teak panel main door 2" incl 6" x 4" teak frame, 3 coats shellac polish	sf	15.00
WI collapsible door, ¾" MS channels, ¼" x $\frac{3}{16}$" diagonal incl top & bottom runners & ball bearing rollers, 2 coats of aluminum paint	sf	7.00
WI ornamental grill ⅝" x ⅝" sq rod to front window at ground level, 2 coats aluminum paint, window guard	sf	14.00
MS rod ⅝" at 4" c/c with 2" x ¼" MS flat iron vertical to side under ground floor only incl 3 coats oil paint	sf	8.25
Asbestos sheet ceiling on & incl teak joist 5" x 2" at 4' c/c and 2" x 1½" cross @ 2' c/c incl 2" x ½" moulded cover strip incl 3 coats whitewash, oil paint to beading	Csf	166.00
Xtra over above ceiling to form teak ventilator 4' x 4'	ea	65.00
to form 2' x 2' manhole with trap door to ceiling	ea	20.00
Teak wood, 1st cl, wrought & fixed to purlin	cf	25.00
Teak fixed venetian to gable end 1½" incl frame with 3 coats oil paint	sf	8.00
Corrug asbestos sheet roof fixed to purlin incl drive screw, felt, limpet washers	Csf	132.00
Sheet ridging, 24 BWG, GI to shape & to fit corrug, fixed with drive screw, felt & limpet washers	rf	3.50
Eaves board, 10" x 1" teak, fixed to purlin with WI clamp	rf	2.25
Eaves gutter with GI 22 BWG sheet to shape, WI clamp at 4' c/c, 3 coats oil paint	rf	6.50
Box gutter, 22 BWG GI on & incl 5" x 2" bearer & 1" teak board fixed to slope, 2 coats of earth oil to timber work	rf	12.00
Flashing to wall above box gutter, 12" GI incl cutting chase & make good to brick work & plaster	rf	2.00
Lead flashing over hipend, 5 lb/sf	sf	6.00
Rain water pipe, 4" ϕ incl fittings, 3 coats of oil paint	rf	6.50
Steel, supply, fabricate, erect incl 1 coat paint before erection, 2 coats after	cwt	60.00
White wash to ceiling & beams with proper binder, 3 coats	Csf	4.00
Colour wash to internal wall with proper binder, 3 coats	Csf	5.00
Snowcem to external wall, 2 coats	Csf	16.00
Linseed oil to door & windows, 2 coats	Csf	10.00
Flag pole, 20' teak, with pully & rope, incl 3 coats oil paint	ea	285.00
Shellac polish to glazed & panel partitions, 3 coats	Csf	50.00

Strong Room

Earthwork in foundation incl part backfill	Ccf	7.00
RC conc 4:2:1 with stone chipping in:		
foundation reinf with 1" ϕ MS rod at 6" c/c both ways	cf	5.00
wall reinf with 2 rows of ¾" ϕ MS rod vert hooked to foundn reinf at 6" apart with ¼" ϕ MS rod as dist rod across, incl all shuttering	cf	9.25
roof slab, 9" with ¾" ϕ MS rod at 6" c/c ⅜" ϕ cross	sf	6.75
to floor, 6" reinf with ¼" ϕ MS rod at 6" apart both ways & furnished with 2:1 cement mortar in one operation	sf	3.50
Ventilator at top & bottom to wall	ea	20.00
Plaster to wall & ceiling, 3:1	Csf	40.00
Colour wash to wall & ceiling, 3 coats	Csf	5.00
Strong room door, provisional, 2½" anti-blow pipe door & gate, with grip frame & vestibule plates for 18" wall, watertight 2 keylocks ea on door & gate, clear opening 6'–3" high x 2'–7"	ps	9,200

Wide Range in Materials Costs Delivered at Site

July 1955 Prices		Cost in Kyats		By Districts	
Material	Unit	Min	Max	Minimum Cost	Maximum Cost
Sand	100 cf	K 8	K 40	Myingyan	Hsipaw, Lashio, Kutkai*
Stone, crushed	100 cf	K 35	K 300	Hsipaw, Lashio, Kutkai*	Rangoon-Hmawhi*
Gravel, river	100 cf	K 12	K 120	Yamethin, Toungoo, Meiktila	Tharrawaddy
Laterite	100 cf	K 25	K 70	Myitkyina, Kutkai*	Insein Dist incl Rangoon
Cement	t	K 224	K 700	Meiktila, Prome	Kunhina to Siam border
Steel, struct	t	K 650	K 2800	Rangoon-Insein Dist	Mandalay to Sagaing, Maymyo to Hsipaw & to Meiktila
Reinf steel	t	K 420	K 2520	Myitkyina	Myitkyina & Naga
Bitumen	t	K 312	K 930	Yamethin, Toungoo	Kunhina to Siam border
Conc, mix & plac	cf	K 1	K 18	6 Divs, incl Lashio	Naga Hills
Drain pipes, 18"	lf	K 10	K 23	Myitkyina	Prome
24"	lf	K 13	K 38	Mandalay to Meiktila, Hsipaw	Naga Hills
36"	lf	K 20	K 66	Insein	Naga Hills
48"	lf	K 32	K 96	Kyaukse	Naga Hills
Teak	cf	K 10	K 17	Moulmein,* Myitkyina	Meiktila, Thayetmyo*
Pyingkado	cf	K 6	K 16	Shwebo* to Tamu*	Mandalay, Maymyo, Moulmein*

* Not shown on map

V-LOK

TRADE MARK REGISTERED

SCHOOLS HOSPITALS

A STRUCTURAL FRAMING SYSTEM

EMPLOYING A RIGID CONNECTION WITHOUT BOLTS, RIVETS OR WELDING — REDUCING ERECTION TIME FROM WEEKS TO DAYS—GETTING A BUILDING UNDER ROOF TO SPEED UP FINISHING WORK AND ADVANCE OCCUPANCY.

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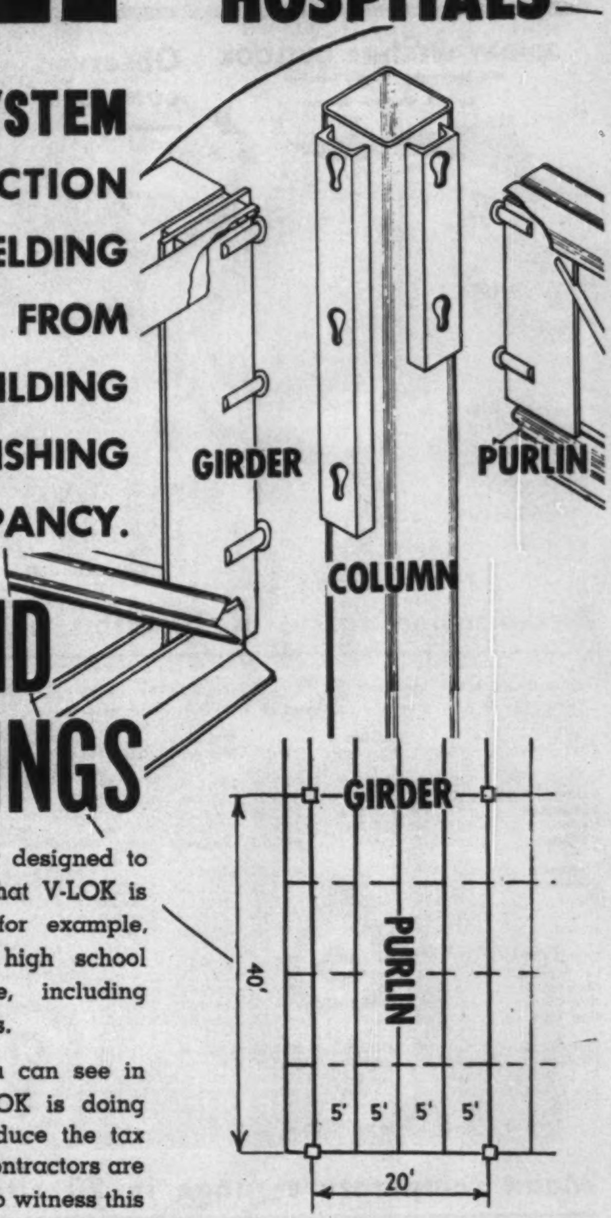


Think back—think of all the products or systems ever designed to reduce construction costs. Then for factual proof of what V-LOK is doing in school work, for example, watch a big rambling high school frame erected complete, including steel deck, in a few days.

ARCHITECTS & ENGINEERS REFERENCE MANUAL OF V-LOK Steel Framing DESIGN DETAILS

MACOMBER · INCORPORATED · CANTON · OHIO

You're a tax payer. You can see in parents' faces what V-LOK is doing across the country to reduce the tax burden. Architects and Contractors are actually inviting parents to witness this construction achievement. It is obvious that a medical center, suburban insurance office, factory or warehouse will give YOU and the OWNERS the same advantage. One V-LOK job is so satisfying, others follow **Write for Design Manual**

A RIGID EXPANDABLE STEEL STRUCTURE

STANDARDIZED STEEL BUILDING PRODUCTS

MACOMBER INCORPORATED

CANTON 1, OHIO

• ENGINEERING • FABRICATING AND ERECTING •

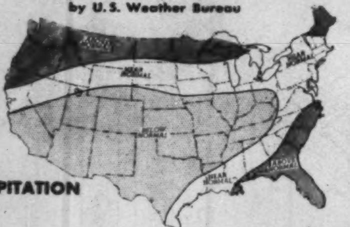
- NAILABLE STEEL JOISTS
- LONGSPANS
- BOWSTRING ROOF TRUSSES
- METAL DECK
- V-LOK STEEL FRAMING
- STRUCTURALS

WEATHER

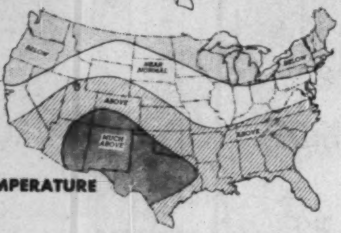
30-DAY WEATHER OUTLOOK

Mid-September to mid-October

by U.S. Weather Bureau



PRECIPITATION



TEMPERATURE

Observed weather in 20 cities, compared with normals

	Precipitation, inches				Temperature, degrees			
	Aug. 1955	Departure fr. normal	8 Mos. 1955	Departure fr. normal	Aug. 1955	Departure fr. normal	Av. daily maximum	Av. daily minimum
Atlanta	1.54	− 2.27	30.48	− 5.16	80.1	+1.5	89.6	70.6
Baltimore	18.35	+13.95	36.37	+ 6.50	78.1	+3.7	86.4	69.8
Birmingham	0.82	− 3.73	36.29	− 2.43	81.1	+2.0	91.9	70.2
Boston	17.09	+13.86	40.45	+14.33	74.5	+3.0	82.5	66.5
Chicago	5.35	+ 2.16	22.14	− 0.51	78.7	+6.0	88.7	68.7
Cincinnati	4.14	+ 0.76	32.38	+ 4.01	78.0	+3.2	88.9	67.0
Cleveland	3.82	+ 1.18	28.22	+ 6.64	76.1	+4.2	85.7	66.5
Dallas	1.56	− 0.27	18.02	− 5.97	84.4	−1.4	94.9	73.9
Denver	2.02	+ 0.67	8.69	− 1.59	73.7	+1.3	85.0	62.3
Detroit	3.75	+ 1.13	16.17	− 5.41	75.7	+4.4	85.2	66.2
Kansas City	3.27	− 0.62	24.13	− 0.73	80.9	+1.9	90.6	71.1
Los Angeles	0.05	+ 0.03	9.10	− 0.53	75.2	+2.3	85.8	64.6
Minneapolis	2.84	+ 0.05	15.61	− 2.31	76.1	+4.6	86.1	66.0
New Orleans	13.79	+ 7.38	51.41	+ 5.94	83.2	−0.2	89.9	76.4
New York	13.82	+ 9.48	28.49	− 0.67	77.2	+4.0	83.9	70.4
Philadelphia	9.70	+ 5.12	25.38	− 3.94	78.1	+4.1	86.5	69.7
Pittsburgh	8.17	+ 5.07	27.07	+ 0.90	76.7	+3.6	85.9	67.4
St Louis	2.12	− 1.65	22.23	− 4.20	81.1	+2.5	89.7	72.5
San Francisco	T	− 0.01	7.07	− 5.41	56.4	−2.9	62.1	50.6
Seattle	T	− 0.87	13.23	− 4.25	63.2	−2.0	71.9	54.5

T traces (less than 0.005 inches)

Precipitation range in 20 cities, in inches

Table shows range observed 33.3% of time. Rainfall heavier 33.3% of time, lighter 33.3% of time.
Computed by U. S. Weather Bureau (based on historical records of actual precipitation)

City	Sept.	Mid. Sept.- Mid. Oct.	Oct.	Mid. Oct.- Mid. Nov	Nov.	Mid Nov.- Mid Dec.	Dec.	Mid Dec.- Mid Jan.	Jan.	Mid Jan.- Mid Feb.	Feb.	Mid Feb.- Mid Mar.	Mar.	Mid Mar.- Mid Apr.
Atlanta	1.69/3.60	1.64/3.35	1.59/2.90	2.01/3.38	2.43/3.85	2.94/4.58	3.46/5.30	3.42/5.32	3.39/5.33	3.38/5.50	3.36/5.67	3.40/6.00	3.43/6.33	3.12/5.72
Baltimore	2.10/3.36	1.88/3.57	1.66/3.77	1.16/3.45	1.56/3.12	1.99/3.43	2.41/3.73	2.59/3.85	2.77/3.96	2.57/3.68	2.36/3.39	2.48/3.76	2.59/4.13	2.59/4.17
Birmingham	1.71/3.69	1.62/3.14	1.52/2.58	1.84/3.24	2,17/3.91	2.94/4.83	3.71/5.75	3.75/5.58	3.75/5.40	3.61/5.64	3.47/5.88	4.18/6.26	4.48/6.63	3.91/5.85
Boston	2.04/3.70	2.26/3.88	2.49/4.07	2.62/4.26	2.74/4.46	2.82/4.33	2.89/4.20	2.83/4.12	2.39/3.45	2.70/3.99	2.64/3.93	2.12/3.58	2.94/4.50	2.66/4.45
Chicago	2.09/3.75	1.84/3.42	1.59/3.10	1.59/2.95	1.59/2.80	1.46/2.62	1.32/2.45	1.30/2.28	1.29/2.10	1.40/2.16	1.52/2.23	1.76/2.67	1.99/3.11	2.09/3.12
Cincinnati	1.79/3.08	N.A.	1.49/2.90	1.74/3.28	1.99/3.67	2.14/3.48	2.29/3.28	2.32/3.54	2.34/3.80	2.07/3.40	1.80/3.00	2.10/3.64	2.39/4.29	2.26/3.94
Cleveland	2.30/3.41	2.03/3.29	1.75/3.16	1.79/2.97	1.82/2.77	1.76/2.68	1.70/2.56	1.65/2.58	1.59/2.60	1.55/2.52	1.51/2.43	1.81/2.71	2.10/2.98	2.15/3.13
Dallas	1.77/3.10	1.66/3.30	1.55/3.50	1.60/3.25	1.64/3.00	1.36/3.00	1.09/3.00	1.24/3.05	1.39/3.10	1.49/2.70	1.59/2.30	1.96/3.08	2.34/3.86	2.50/4.68
Denver	0.52/1.05	0.57/1.08	0.62/1.10	0.46/0.89	0.29/0.68	0.34/0.72	0.39/0.77	0.28/0.64	0.19/0.50	0.26/0.54	0.34/0.58	0.46/0.84	0.59/1.10	0.96/1.75
Detroit	1.82/3.44	1.72/3.02	1.63/2.69	1.70/2.66	1.77/2.78	1.70/2.66	1.64/2.60	1.63/2.50	1.62/2.40	1.56/2.45	1.51/2.50	2.14/2.64	1.77/2.78	1.78/2.75
Kansas City	2.99/5.00	2.34/4.54	1.69/4.07	1.48/3.21	1.27/2.35	1.02/1.95	0.77/1.55	0.68/1.48	0.59/1.42	0.80/1.66	0.99/1.90	1.29/2.40	1.59/2.90	1.99/3.15
Los Angeles	T/0.03	0.08/0.32	0.15/0.60	0.20/0.95	0.26/1.30	0.70/2.00	1.14/2.70	1.19/3.00	1.24/3.30	1.12/3.25	0.99/3.20	1.06/3.08	1.13/2.95	0.68/1.92
Minneapolis	2.29/3.85	1.79/3.15	1.29/2.45	0.98/2.01	0.67/1.57	0.62/1.44	0.57/1.30	0.60/1.19	0.64/1.08	0.58/1.08	0.52/1.08	0.75/1.38	0.98/1.67	1.34/2.14
New Orleans	3.11/5.50	2.55/4.81	1.99/4.12	2.34/4.40	2.69/4.67	2.96/4.92	3.24/5.17	3.36/5.28	3.49/5.40	3.14/5.05	2.79/4.70	3.00/5.00	3.22/5.30	2.94/5.15
New York	2.21/3.40	2.15/3.76	2.09/4.13	2.15/4.04	2.21/3.95	2.42/3.86	2.64/3.77	2.55/3.71	2.46/3.65	2.41/3.88	2.36/4.10	235/4.08	2.34/4 05	2.40/3.92
Philadelphia	2.09/3.90	2.04/3.85	1.99/3.80	2.18/3.65	2.36/3.50	2.50/3.70	2.64/3.90	2.60/3.80	2.57/3.70	2.57/3.69	2.57/3.68	2.60/3.84	2.62/4.00	2.56/3.91
Pittsburgh	1.87/2.80	1.98/3.00	2.09/3.20	1.96/2.96	1.84/2.72	1.96/3.00	2.09/3.27	2.12/3.20	2.14/3.13	1.96/2.98	1.77/2.83	2.06/3.15	2.34/3.47	2.32/3.44
St. Louis	2.09/3.58	1.89/3.42	1 69/3.25	1.78/3.28	1.86/3.30	1.70/3.05	1.64/2.80	1.52/2.75	1.39/2.70	1.48/2.80	1.57/2.90	1.92/3.42	2.27/3.95	2.43/2.88
San Francisco	0.00/0.26	0.10/0.73	0.19/1.20	1.12/2.25	1.04/3.30	1.62/4.28	2.19/5.25	2.34/5.12	2.49/5.00	2.24/4.86	1.99/4.71	1.96/4.13	1.94/3.55	1.30/2.54
Seattle	1.07/2.20	1.70/2.85	2.32/3.50	3.07/4.55	3.82/5.60	4.00/5.74	4.17/5.89	4.14/5.57	4.12/5.25	3.34/4.92	2.55/4.60	2.18/4.02	1.81/3.43	1.72/3.16

T—Traces (Less than 0.005 inches)

Mean temperature range in 20 cities, in degrees F.

Table shows range observed 25% of time. Mean temperature higher 37.5% of time, lower 37.5% of time.
Computed by U. S. Weather Bureau (based on historical records of actual temperature)

City	Sept.	Mid. Sept.- Mid. Oct.	Oct.	Mid. Oct.- Mid. Nov.	Nov.	Mid Nov.- Mid Dec.	Dec.	Mid Dec.- Mid Jan.	Jan.	Mid Jan.- Mid Feb.	Feb.	Mid Feb.- Mid Mar.	Mar.	Mid Mar.- Mid Apr.
Atlanta	72.9/75.4	68.2/70.2	62.3/63.8	56.6/58.2	51.1/52.7	46.6/48.4	44.0/46.0	48.3/50.3	43.5/45.5	44.0/46.4	45.1/47.9	47.5/50.1	51.2/53.6	55.9/58.0
Baltimore	67.1/69.4	62.2/64.4	56.4/58.3	50.9/52.6	45.6/47.0	40.2/42.0	35.8/37.8	34.2/36.1	33.9/35.7	33.2/36.0	34.6/38.0	38.1/41.7	42.0/45.7	46.6/49.4
Birmingham	73.3/75.6	68.5/70.7	62.2/64.2	56.2/58.5	50.7/53.2	46.5/48.9	44.3/46.5	43.4/46.1	43.5/46.5	44.4/47.6	46.0/49.4	48.8/51.7	52.4/54.7	56.6/58.5
Boston	63.3/65.4	58.9/61.0	54.2/56.2	49.3/51.3	43.6/45.6	36.8/39.2	31.2/34.0	28.9/31.9	30.3/31.2	26.4/29.6	27.8/30.0	31.4/34.0	35.6/38.6	41.1/43.3
Chicago	64.5/66.7	59.3/61.7	52.8/55.3	45.9/48.6	38.6/41.5	31.2/35.0	25.7/30.3	23.7/28.5	23.2/28.1	23.1/28.1	24.7/30.0	29.2/34.2	34.6/39.1	40.9/43.8
Cincinnati	66.5/68.4	61.2/63.3	55.9/57.1	48.6/50.9	42.0/44.5	35.9/39.1	31.4/35.2	30.1/34.4	29.8/34.6	29.9/34.4	31.6/36.0	35.2/39.2	39.6/43.1	45.4/48.1
Cleveland	64.7/67.1	59.5/61.8	53.5/55.6	47.1/49.3	40.5/42.7	34.3/37.2	29.3/32.9	27.3/30.9	26.9/30.5	26.0/29.6	26.2/29.7	29.8/33.7	34.7/38.8	40.3/43.2
Dallas	78.1/79.7	73.8/75.1	68.5/69.4	61.4/63.1	54.3/56.7	49.9/52.3	47.0/49.3	44.8/48.1	44.1/47.5	45.8/49.2	48.8/52.2	51.9/55.6	55.5/59.6	60.1/64.0
Denver	62.2/63.4	56.7/58.3	50.8/52.8	44.5/47.2	38.0/41.4	33.5/36.7	30.5/33.5	28.3/31.4	27.0/30.0	27.9/31.5	30.5/34.7	33.1/36.8	35.9/39.1	40.4/43.2
Detroit	63.0/65.6	57.8/60.2	51.9/54.1	45.8/47.9	39.2/41.1	32.9/35.3	27.9/30.9	25.6/28.5	24.8/27.7	24.2/27.8	24.6/28.9	27.9/32.1	33.1/37.2	39.3/42.1
Kansas City	69.7/71.9	64.4/67.0	58.1/61.2	50.7/53.9	42.6/45.9	36.7/40.1	32.4/35.9	30.4/33.0	30.0/31.9	30.2/33.6	32.2/37.1	37.3/41.2	42.9/45.9	48.6/51.3
Los Angeles	65.9/67.3	64.4/65.9	62.7/64.2	60.5/62.1	57.9/59.8	56.5/58.2	54.9/56.5	53.4/54.8	52.7/54.0	53.6/54.3	52.9/55.1	54.1/56.3	55.4/57.4	56.6/58.4
Minneapolis	61.0/63.6	55.5/58.3	49.8/51.7	40.4/44.5	30.9/36.0	24.5/28.1	17.2/22.3	13.8/18.4	13.4/16.5	13.3/17.7	15.0/20.8	21.7/25.9	29.9/32.5	37.3/39.5
New Orleans	78.5/79.7	75.1/76.5	70.5/71.9	64.6/66.8	59.0/61.5	56.0/58.5	54.6/56.8	53.2/56.0	52.6/56.0	54.0/57.4	55.9/59.3	57.6/60.8	60.6/63.0	63.4/65.7
New York	67.4/69.0	62.7/64.3	57.0/58.6	51.8/53.2	46.5/47.9	40.2/42.3	34.6/37.5	34.5/35.2	32.0/34.6	30.9/33.6	30.9/33.6	34.1/36.8	38.7/41.3	43.6/46.0
Philadelphia	66.8/68.5	61.6/63.5	55.6/57.6	50.3/52.3	45.3/47.2	39.9/42.0	35.1/37.3	32.7/35.4	31.8/35.0	31.1/34.3	32.3/35.3	36.4/39.2	40.8/43.5	46.6/47.9
Pittsburgh	64.0/65.9	58.8/60.9	52.0/54.4	46.2/48.2	40.3/42.0	34.0/36.4	29.5/32.6	24.8/28.0	26.9/30.1	26.4/30.5	26.9/32.0	30.5/35.4	36.0/40.6	43.9/46.5
St. Louis	69.1/71.2	64.0/66.3	58.1/60.5	51.0/53.9	43.6/46.9	37.6/41.2	33.3/37.1	30.9/35.1	30.1/34.7	31.3/35.7	33.7/38 1	37.8/41.8	42.9/46.3	48.6/51.5
San Francisco	61.3/62.8	60.4/62.0	58.5/60.2	56.4/57.9	53.8/55.0	50.7/52.3	48.7/50.2	47.1/48.9	46.9/49.1	48.3/50.8	50.0/51.7	51.0/52.8	51.7/53.5	52.4/54.2
Seattle	58.0/59.0	54.8/56.1	51.0/52.5	41.8/43.8	43.1/44.5	41.0/42.4	39.4/40.7	37.7/39.0	37.2/38.5	38.2/40.0	39.7/42.0	41.7/43.3	43.6/44.7	45.6/47.2

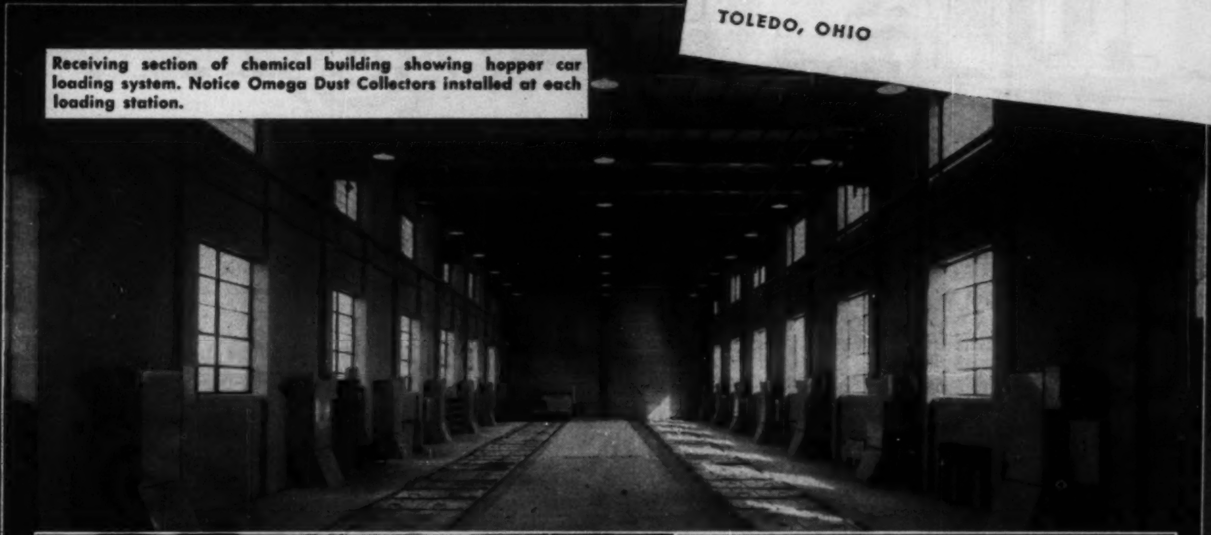
TOLEDO, OHIO

Collins Park Filtration Plant

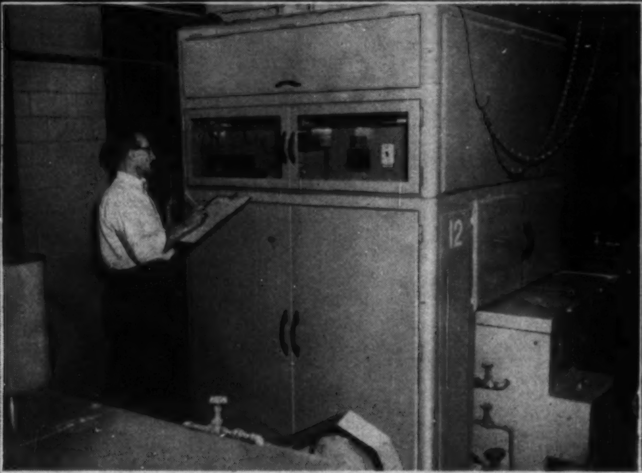
(COMPLETED IN 1954)

FINKBEINER, PETTIS & STROUT
Consulting Engineers

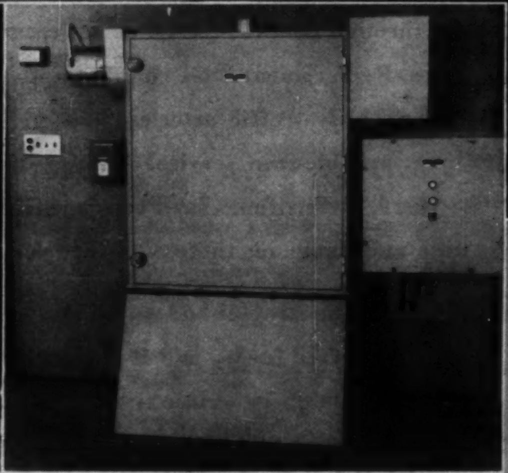
TOLEDO, OHIO



Receiving section of chemical building showing hopper car loading system. Notice Omega Dust Collectors installed at each loading station.



Omega Model GLW-2 Loss-in-Weight Gravimetric Feeder with Lime Slaker. This type of feeder was chosen in order to gain maximum accuracy of chemical feed control.



Close-up of Omega Dust Collector with its unitized motor control. Dust Collector is operated only during chemical loading periods.

Toledo, known far and wide as the "glass city", draws its water supply from nearby Lake Erie. Wide seasonal fluctuations in raw water quality demand highly adaptable chemical and mechanical water treating facilities. Omega was selected to supply the chemical feeding and lime slaking equipment needed for this exacting task. As shown in the photos, this equipment has been engineered into a modern chemical storage and feeder building designed for maximum efficiency of chemical handling. For complete details on Omega Water Works Equipment furnished for the Collins Park Filtration Plant, write Omega Machine Co., Providence 1, R. I.

Ω

OMEGA *THE LAST WORD IN* **FEEDERS**

DIVISION OF B-I-F INDUSTRIES, INC.

BUILDERS IRON FOUNDRY • PROPORTIONEERS, INC. • BUILDERS-PROVIDENCE, INC.

B-I-F METERS FEEDERS CONTROLS

on BIG expressway projects

...LOOK FOR CLAY PIPE

In Chicago's new Wacker Drive Extension, part of a $469 million expressway program, thousands of feet of Vitrified Clay Pipe in diameters ranging from 8 to 27 inches are being installed. As in similar projects all over the country, this modern expressway cuts through dozens of existing sewerage lines. Replacement lines running under these busy traffic arteries *must* give long, trouble-free service. That's why you find Vitrified Clay Pipe specified time and again on these vital projects.

Clay Pipe has the strength to stand up under heavy surface loads, and it *keeps* that strength through generations of service. Acid sewer gases or corrosive industrial wastes can't weaken it. *It never wears out.*

12:58
Coca-Cola

Vitrified

CLAY

CLAY PIPE NEVER WEARS OUT!

PIPE

C-755-1

NATIONAL CLAY PIPE MANUFACTURERS, INC.
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703 Ninth & Hill Bldg., Los Angeles 15, Calif.
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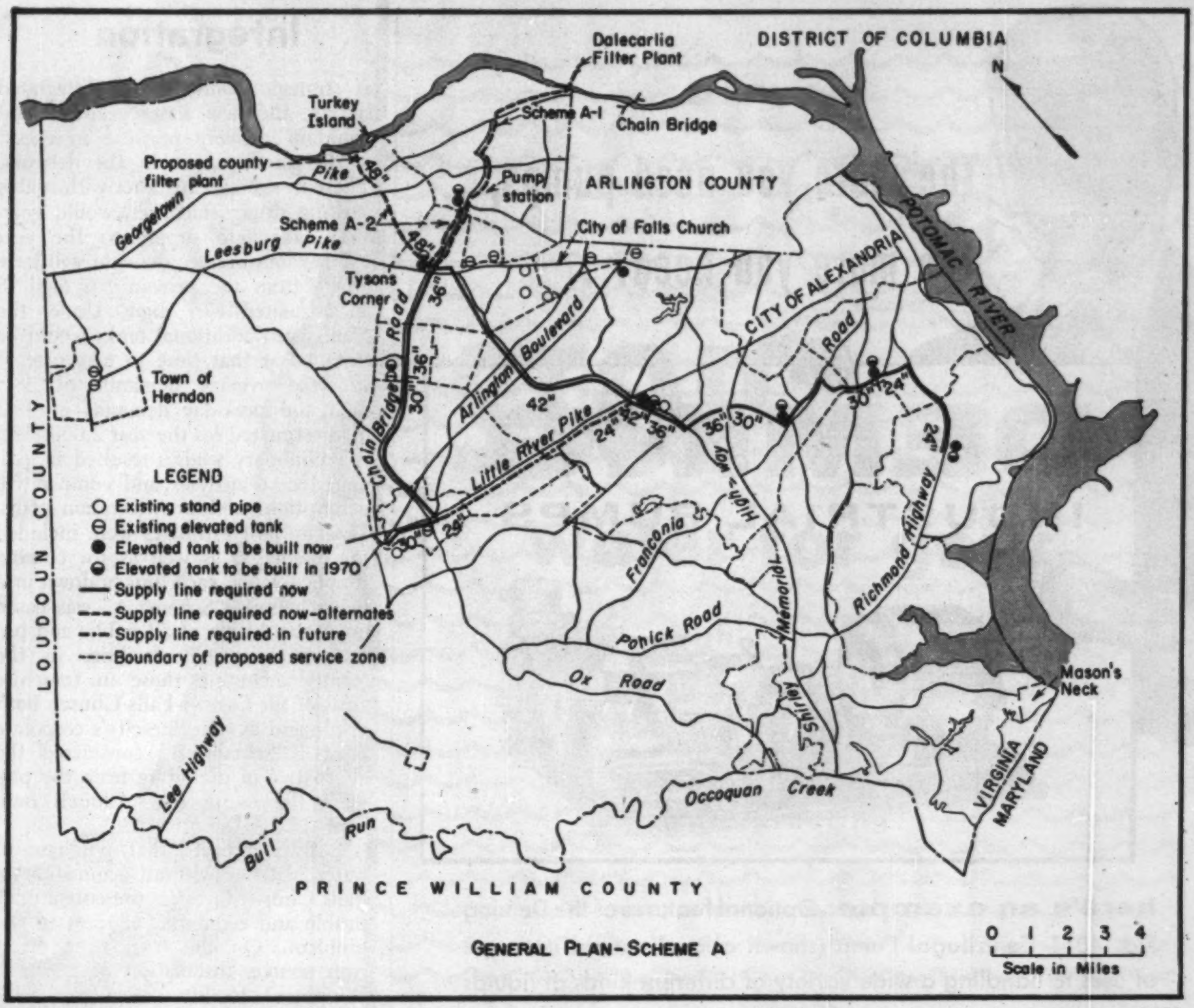

Dalecarlia Filter Plant
DISTRICT OF COLUMBIA
N
Turkey Island
Scheme A-1
Chain Bridge
Proposed county filter plant
Georgetown Pike
48"
Pump station
ARLINGTON COUNTY
Scheme A-2
City of Falls Church
Leesburg Pike
Tysons Corner
48"
36"
Chain Bridge Road
36"
30"
36"
Arlington Boulevard
CITY OF ALEXANDRIA
POTOMAC RIVER
Road
Town of Herndon
42"
Little River Pike
24"
24"
36"
36"
30"
30"
24"
24"
30"
29"
High-way
Memorial
Shirley
Franconia
Richmond Highway
Pohick Road
Ox Road
Mason's Neck
LOUDOUN COUNTY
LEGEND
○ Existing stand pipe
⊖ Existing elevated tank
● Elevated tank to be built now
◉ Elevated tank to be built in 1970
Supply line required now
Supply line required now-alternates
Supply line required in future
Boundary of proposed service zone
Lee Highway
Bull Run
Occoquan Creek
VIRGINIA
MARYLAND
PRINCE WILLIAM COUNTY
GENERAL PLAN-SCHEME A
0 1 2 3 4
Scale in Miles

NATURAL TOPOGRAPHY AND GEOGRAPHY spell solution to problems of 139,000 water users—twice that number in 1970.

Integration—Is It the Cure for Water Troubles?

County that brought all sewerage under one agency has assurance that plan could work for water, too.

Facing an inadequate supply of water in the near future and a complicated problem of providing plant and distribution facilities to fulfill its needs, Fairfax County Va., may resort to the same device that is counted upon to cure its sewage disposal woes.

With the integration of seven public and private sewer district systems under a single administrative agency (Board of County Supervisors), the northern Virginia county is pushing a $17.1-million program of treatment plant construction, pipe installation and facilities acquisition that is designed to serve the area adequately, far into the future (ENR, Sep 30, 1954, p 34).

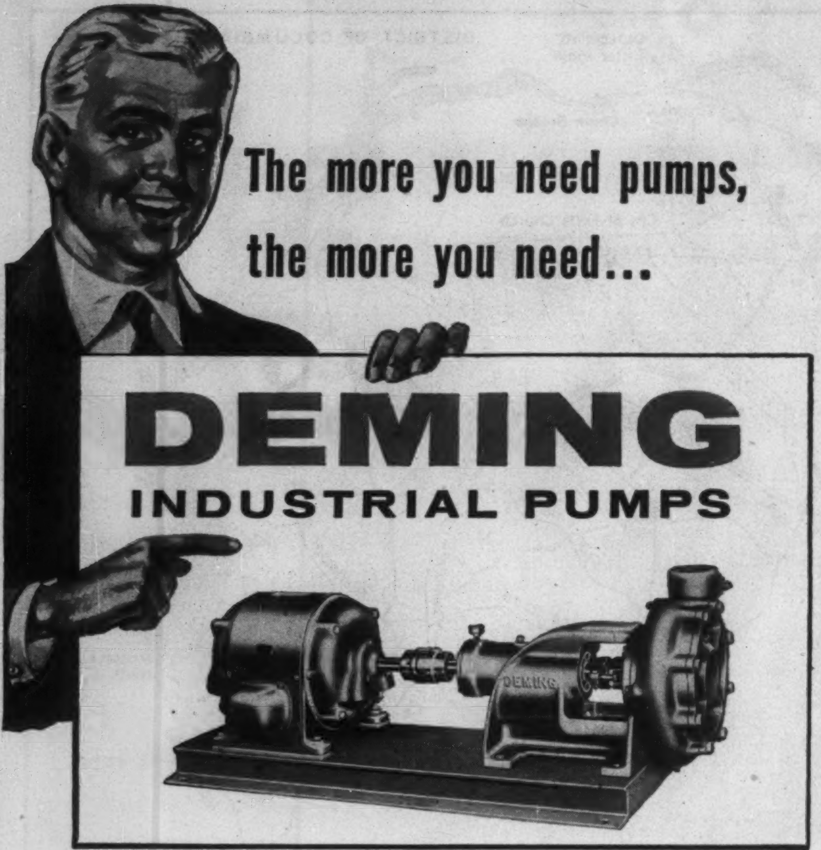
Integration of sewerage facilities was shown to have a distinct cost advantage over other solutions to the Fairfax problem, ostly through eliminating duplication of plant, administration and operation costs. The question was: could it work for water supply, too?

Studies indicate that with few exceptions, 19 existing water companies now serving the county area are inadequate to render service essential to present needs or future growth. A report on the county's problem and its possible solution has been presented by Alexander Potter Associates, consulting engineers of New York City, and it is their recommendation that water supply and distribution facilities be integrated under county jurisdiction also.

It has been found, according to the firm, that it is economically and physically feasible for all existing water systems—there are four public and 15 private companies—to be joined into a single system that can be served by a county-developed and -operated source of supply from the Potomac River, or by purchasing water from the District of Columbia immediately to the north and across the river from Fairfax County.

• **Topography is the key**—Sitting at an elevation of 518 ft—the highest point in the county—is Tyson's Corner, located only four miles from the potential Potomac River source and less than seven and one-half miles from the Dalecarlia Filtration Plant that supplies Washington, D. C. Water from either source could be pumped to primary storage facilities at Tyson's Corner and from there all transmission would be accomplished by gravity.

By maintaining a 600-ft high-water level in the primary storage tank, and by erecting seven new elevated tanks



The more you need pumps, the more you need...

DEMING
INDUSTRIAL PUMPS

here's an example: Optional features of the Deming Fig. 4011 Centrifugal Pump (shown above) extend its scope of uses to handling a wide variety of different kinds of liquids . . . corrosive or non-corrosive. In many cases, this versatile pump eliminates the need for higher-cost pumps built entirely of corrosion-resistant metals. Other optional features include a choice of impellers and either stuffing box, or mechanical seal construction. BULLETIN No. 4011 explains this popular Deming Pump. Send for copy.

NOTE THE SCOPE OF THE DEMING LINE

- **Small side suction Centrifugal Pumps**
- **Centrifugal Pumps with separate liquid end**
- **"Motor-Mount" Centrifugal Pumps**
- **Split case Centrifugal Pumps**
- **Self-priming Centrifugal Pumps**
- **High pressure Multi-Stage Pumps**
- **"Oil-Rite" Duplex and Triplex Pumps**
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- **Vertical Sewage Pumps**
- **Submersible Pumps**

A Deming Distributor is near you for prompt service

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THE DEMING COMPANY
536 BROADWAY • SALEM, OHIO

. . . Integration

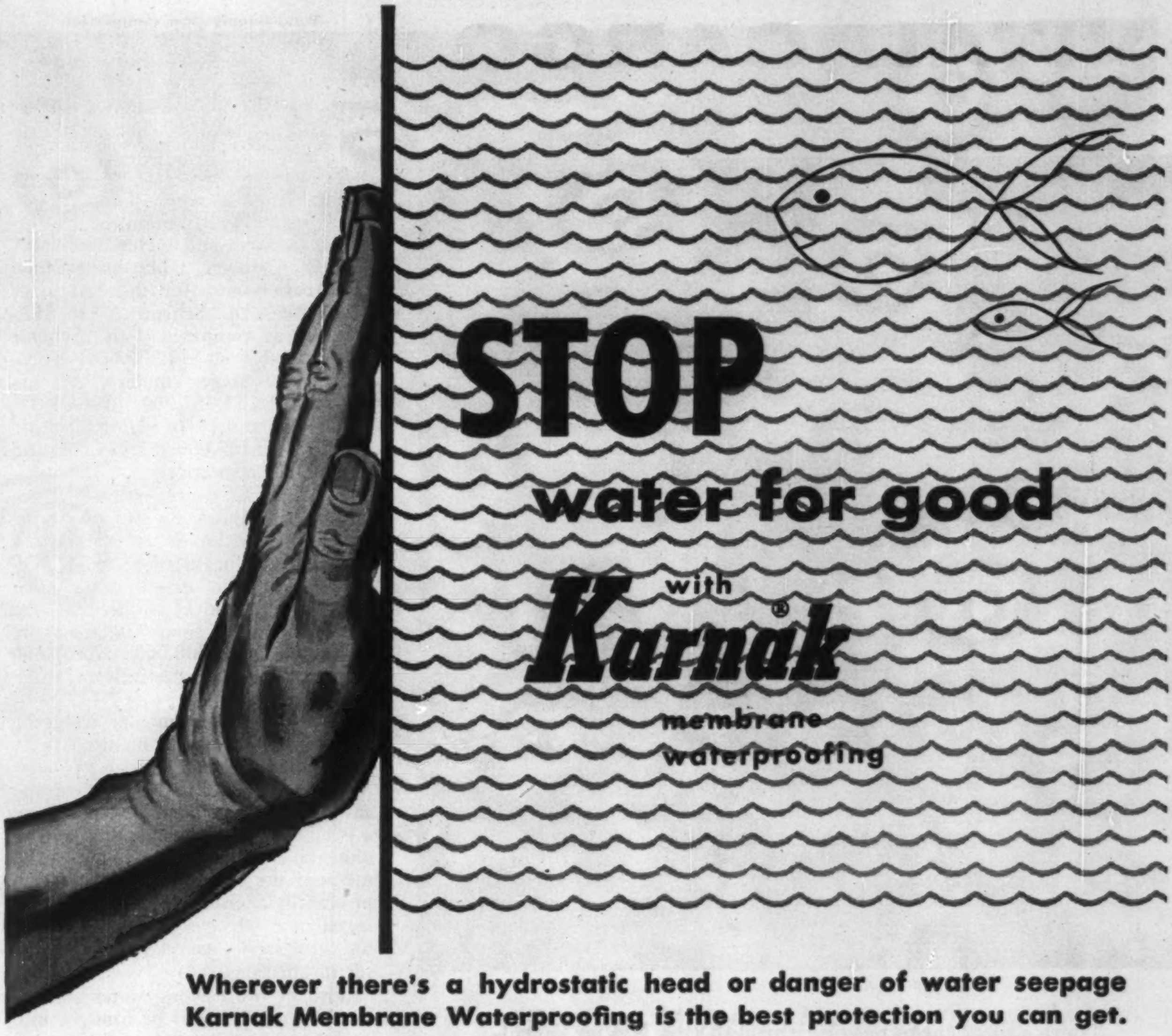
at strategic points in the integrated system, the new water agency could maintain delivery pressure in excess of 40 psi anywhere in the network. These new tanks, together with usable existing storage facilities, would guarantee adequate supply to the year 1970, when average demand will have grown from the present 8.6 mgd to an estimated 17.7 mgd. Under the plan, seven additional tanks would be installed at that time to take care of expected average demands of 28.8 mgd and peak-day demands of 43.2 mgd estimated for the year 2,000.

Preliminary studies resulted in estimated cost analyses and comparative descriptions of four integration plans. Separate cost estimates were included for purchased as well as for county-supplied water, each broken down into two schemes. "Scheme A" was based upon acquisition of all public and private water supply facilities in the county including those in franchise areas of the City of Falls Church both inside and outside the city's corporate limits. "Scheme B" considered the alternative of excluding from the program the entire Falls Church franchise.

Results indicate that purchase of water, with or without acquisition of Falls Church facilities presents a practicable and economic solution to the problem. On the basis of a direct river source, installation of pumping equipment to lift water from river level to elevation +300 in the first lift, thence to +600 in the second would cost an estimated $650,000. But under the water-purchase plan, water from the Dalecarlia source would be drawn at an elevation of +422, thus eliminating most of the initial pumping facilities cost.

In addition, the treatment facilities including intake structure and diversion dam would cost an estimated $3.2 million. In all, supply facilities under the direct river source plan would cost $6.14 million as compared with $2.97 million for the Dalecarlia purchase plan, which includes the longer supply line and river crossing.

Operating costs for the direct source are estimated at $301,000 (annual average for the first 15 years) as compared with the Dalecarlia source figure of $82,000. Water purchased from the district, however, would cost $336,000 based upon a proposed rate of 80¢ per mg. This would bring the Dalecarlia total to $408,000, or $107,000 more than the direct source annual operating cost. New operating costs, however, heavily favor Dalecarlia.



Wherever there's a hydrostatic head or danger of water seepage Karnak Membrane Waterproofing is the best protection you can get.

Karnak membrane fabric is saturated so that it is non-sticking and unrolls easily... to the very end. There is no waste. It "works" faster, lays on wrinkle-free...saves labor cost on the job.

Open mesh, long-fiber-cotton cloth, saturated with specially prepared asphalt so as to leave the mesh open, is layered on the job with alternate moppings of highly refined, ductile asphalt. The open mesh allows the mopping asphalt to penetrate and interlock the layers. This provides a firm, mechanical bond that resists abrasions, settling and cracking thus maintaining water resistance through the life of the structure.

The layering of fabric and asphalt is the only method of waterproofing that insures proper thickness of asphalt throughout the application. For normal application with hydrostatic head up to 15 feet, two plies of fabric are sufficient; hydrostatic head of 15 to 20 feet takes three plies; four plies are sufficient to waterproof any class of work regardless of hydrostatic head.

Whatever *your* waterproofing problem, Karnak will prove best. Bridges, buildings, tunnels, retaining walls, viaducts, swimming pools, all need and use Karnak. The Merchandising Mart, Chicago, Ill., used Karnak over twenty-five years ago...the Fairless Works of U.S. Steel used it last year. Specify Karnak on your next waterproofing job.

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Asphalt Roof Coatings and Cements • Caulking Compounds • Asphalt Emulsions • Tile Cement
Asphalt Paint • Wood Block Mastic • Joint Filler • Aluminum Asphalt Roof Coating

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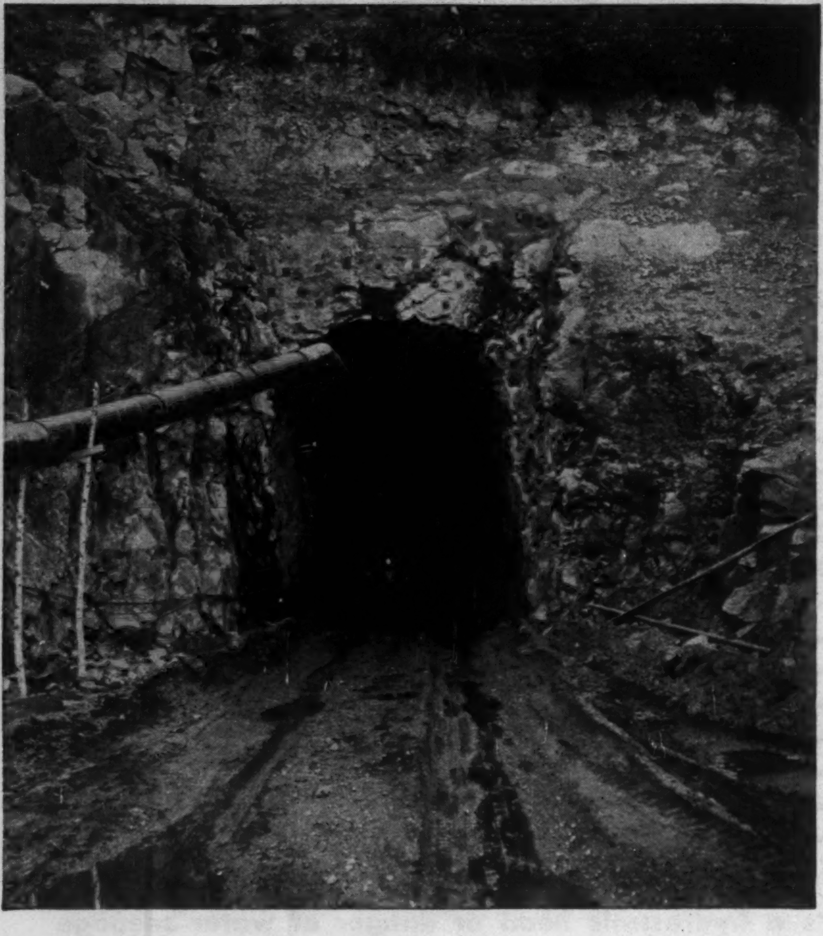
VITAL CARGO



There's vital cargo passing through this Naylor Spiralweld pipe because this line is pushing in fresh air to the heading and pulling out stale air, gases and fumes. There's no more vital ingredient than air in underground construction and no better vehicle for it than this distinctive pipe. Lightweight makes Naylor easy to handle and install as work progresses . . . particularly with the one-piece Naylor Wedge-Lock coupling to speed connections. Extra strength and safety are other performance features built into this pipe.

Write for Bulletin No. 507 for the complete story.

NAYLOR PIPE

NAYLOR PIPE COMPANY

1248 East 92nd Street, Chicago 19, Illinois

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Total Supply Cost Comparison (including Falls Church)

	Dalecarlia	Direct River
Capital Cost	$2,977,000	$6,140,000
Annual Operating Cost	$408,000	$301,000
Annual Non-operating Cost..	152,000	313,000
Total Annual Costs.	$560,000	$614,000
(not including Falls Church)		
Total Annual Costs.	$487,000	$523,000

Installation of supply lines to zones, truck mains, distribution mains, hydrants, services and meters and fabrication of storage tanks brings total construction cost for the first stage (1955-1960) of "Scheme A" to $12,938,000 as compared with "Scheme B," estimated at $11,506,000. Three subsequent stages under "A" are 1960-1965, $3,967,000; 1965-1970, $2,684,000 and 1970, $2,258,000; and for "B", $3,169,000, $2,225,000 and $1,915,000 respectively.

Acquisition, contingent allowance and interest during construction bring the total program costs for "A" to $23,350,000 for the first stage, $5,050,000 for the second, $3,350,000 for the third and $2,810,000 for the fourth. For "B", comparable costs are $20,100,000, $4,000,000, $2,800,000 and $2,400,000, respectively.

• **Users pay**—All financing, according to the report, can be by bonds at 3½%. Recommended are Fairfax County Water Revenue Bonds, or as in the case of the integrated sewer system, a combination of revenue and general obligation bonds. Money for retirement of the bonds would be derived principally from water rates and water installation charges (water main extensions, service connections and meter installations).

Two of the existing water systems would not at present be brought into the network. The town of Herndon on the northwestern boundary of the county is supplied by wells that are among the few in the county reported to be satisfactory and their production adequate for present town needs. No economic advantage is seen in connecting this town with the system until demand warrants it. At present Herndon supplies a population of 1,206 and is one of the four publicly owned water companies. The other area is at the opposite end of the county, supplying 59 residents of the Mason's Neck area, which again is too remote from the Tyson's Corner to warrant connection to the county system until future development warrants it.

Total current county population is 162,000—not including Falls Church, which already is supplied by Dalecarlia—with 139,000 in service zones. Of these, only 61,500 are connected to water systems. By 1970 the population will have increased to 235,000 with 210,000 in service areas. Under

Water, Water Everywhere but
not a drop inside!

STANG

PUTS THE SQUEEZE

ON THE

ARKANSAS

RIVER

KEEPING THE WATER LEVEL DOWN with a wild, often summer-flooded river like the Arkansas all around you is a big order. That's why the STANG Wellpoint Engineers were called in to make possible the laying of this 54" water conduit with the river open.

STANG has successfully handled water problems the world over for many years. Our trained engineers have the capability and experience necessary to design the *exact* system to most efficiently and economically beat your particular unwatering problem.

If you have a water problem on a current project (or on one you may be bidding) contact STANG. You will receive a thorough analysis of your project needs and our recommendations *at no cost or obligation to you.*

Write today for our free 100-page Brochure on the STANG WELLPOINT SYSTEM.

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400% MORE PUMPING!

and LESS SHOCK
LESS WEAR
LESS STRAIN

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DIAPHRAGM PUMP
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THE BEST DIAPHRAGM PUMP *Ever Built!*

GORMAN-RUPP Firsts — among all other diaphragm pumps of like size and type.

- Diaphragm drive rod spring-cushioned on down stroke. Runs smoothly. Increases diaphragm life **10 Times.**
- More Pumping — by as much as 400% at 25 feet static lift.
- Suction Accumulator provides continuous smooth flow of water.
- One man handling — engine driven pump only 130 pounds job-to-job. Motor driven 165 pounds.
- Easy hook-and-tighten fittings with hose connected.

See this pump at work on the job, through your Gorman-Rupp distributor. It is absolutely guaranteed to outperform and outlast any 3 in. single diaphragm pump comparably powered now on the market.

Ask for information bulletin 4-DR-11

NOTES FROM THE FIELD - -

Bridging Kokosing River on U. S. Route 36 at Mount Vernon, O. Model 3D-E1½ diaphragm pump and model 3362-B contractors' pump, both electric powered, and model 3205 contractors' pump engine powered - On The Job.

THE GORMAN-RUPP COMPANY
MANSFIELD, OHIO

the integrated system, 199,000 of these will be connected, representing 85% of the total population as compared with 38% now served.

• **Trunks and mains big item**—In all schemes, supply lines, trunk mains and distribution lines represent the largest part of the costs. For "Scheme A", the supply line to primary storage is estimated at 39,500 linear feet of 48-in.-dia pipe. 147,000 L.F. of supply lines to service zones range in size from 24-in.-to 42-in.-dia, and an additional 24-in.-dia line designated as the Little River Pike Line adds 38,600 L.F. to the estimate. The total supply lines network would involve installation of 226,100 L.F., or 42.82 miles.

Storage facilities in the first stage would include one 0.5-mg tank, five 1.0-mg tanks and one 4.5-mg tank to give a total storage of 10 mg in addition to that usable under the present multi-system operation. Fourth-stage would add one 0.2-mg, one 0.4-mg, four 4.0-mg and one 2.0-mg tanks for an additional 16 million gallons.

• **Fairfax isn't the only one**—A plan also has been submitted to the Greensboro, N. C., city council for a six-city dam, water filtration plant and power station on the Yadkin River at Styer's Ferry, 14 mi west of Winston-Salem, which would be designed to furnish enough water to supply large areas of Guilford, Forsyth and Davidson Counties for the next 50 to 100 years.

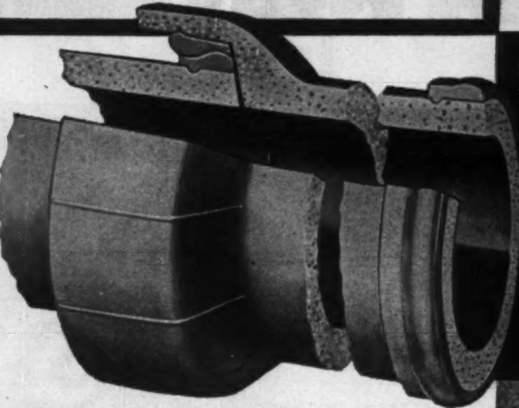
The water, filtered at the dam, would be pumped through a pipeline directly to Winston-Salem and Greensboro, and branches would serve Kernersville, High Point and the Lexington-Thomasville area. Sponsors of the program say that the project would provide treated water more cheaply than it could be supplied by separate filter plants at the various cities, and it would also enable the integrated authority to sell water directly to smaller rural communities and other buyers.

Construction of the hydro-electric plant—one large enough to furnish power to pump the water to the cities—would mean resurrecting old High Point Hydro-electric Project plans of the federal government for a high-dam, power plant and lake that would back water many miles up the Yadkin and its tributaries.

Problems anticipated are the flooding of two expensive bridges that have been built since abandonment of the federal plans several years ago and the repurchase—some by condemnation—of land that was bought by the federal government for the originally planned project, then re-sold when it was dropped.

It's Here

the tightest, fastest-working joint ever developed for bell-and-spigot Clay Pipe!



New Wedge-Lock*
by ROBINSON

PERMANENTLY BONDED DOUBLE-BALL JOINTS ON BELL AND SPIGOT "SNAP" TOGETHER FOR A PERMANENT, LEAK-PROOF SEAL!

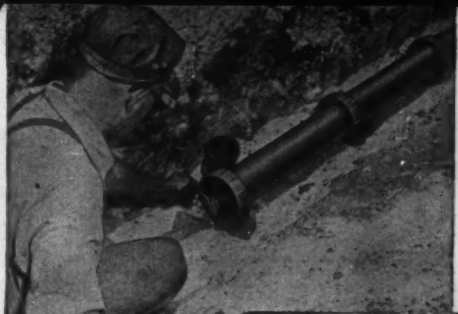
Soon anyone will be able to make perfect Clay Pipe joints — easier and faster than ever before! Installing Wedge-Lock is simply a matter of lubricating the plastic joints with water, graphite solution, or Robinson's special adhesive sealant — and pushing them together. The "double-ball" type joint locks pipe in place . . . and is permanently *root-proof* and *infiltration-proof.*

This new pipe can be installed not only in regular house-to-sewer lines, but inside plastered walls and under basement floors. For inside-the-house installations, where "head" pressures are encountered, Robinson's special adhesive sealant is recommended. It softens the two jointing surfaces, welding them into a single, solid ring.

This new polyvinyl plastic joint, combined with never-wear-out vitrified clay, will form the *perfect* team . . . pipe that can be installed in seconds to last for generations!

A complete line of matching Wedge-Lock Fittings is available.

* T.M. Registration Applied For. Patents Pending.



Just paint the bell joint with lubricant . . . ←

Paint the spigot joint the same way . . . →

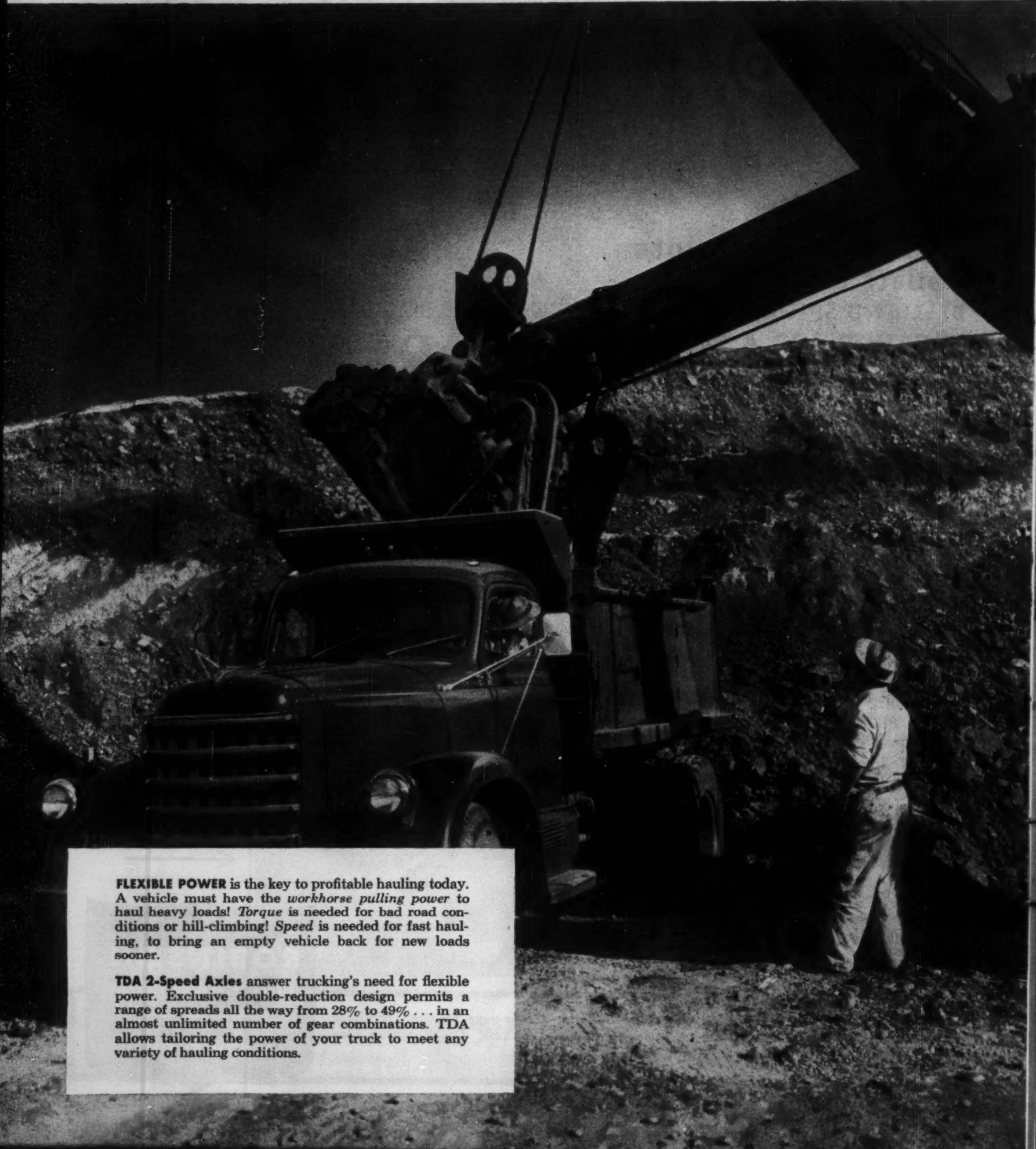
Push the pipe together . . . the joint is complete! ←

THE
ROBINSON
CLAY PRODUCT CO.
ESTABLISHED 1856
AKRON 9, OHIO

WRITE FOR the new Wedge-Lock Clay Pipe Bulletin, a four-page file-sized brochure with complete, advance information on this new product. Address: The Robinson Clay Product Company, 65 W. State St., Akron 9, Ohio.

R 254-76

TAILORED POWER



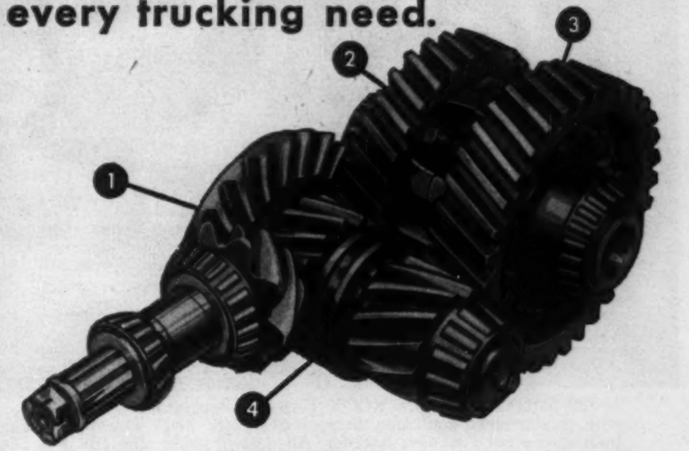
FLEXIBLE POWER is the key to profitable hauling today. A vehicle must have the *workhorse pulling power* to haul heavy loads! *Torque* is needed for bad road conditions or hill-climbing! *Speed* is needed for fast hauling, to bring an empty vehicle back for new loads sooner.

TDA 2-Speed Axles answer trucking's need for flexible power. Exclusive double-reduction design permits a range of spreads all the way from 28% to 49% . . . in an almost unlimited number of gear combinations. TDA allows tailoring the power of your truck to meet any variety of hauling conditions.

COMES TO TRUCKING

with TDA 2-speed axles

Exclusive, double-reduction design offers almost unlimited possibilities of gear ratios and ratio spreads—this versatility provides tailored power for every trucking need.



How TDA's extra "spread" works to your benefit. *All* 2-speed axles employ an extra set of gears to give two ranges of speed or power to choose from . . . one for *pulling power*, the other for fast speed. Most 2-speed axles offer only one choice of "spread"– 37%. Design limitations prevent changing this standard "spread".

However, TDA uses the exclusive double-reduction design. With TDA, spreads are available all the way from 28% to 49%. This means that your axle can actually be tailored to give you just the power you need. Not only can you specify the spread most suited to your immediate trucking need – but you can easily *change* from one spread to another by merely changing the low speed helical pinion and gear – *an easy mechanical change.*

TDA's more efficient use of engine power gives important benefits . . . high road speeds, faster deliveries, better payload, and maximum fuel economy. No matter what your hauling problem or load/road conditions you save with TDA.

How TDA's 2-Speed principle works! A husky hypoid ring gear and pinion set (No. 1 above) provide the *first step* of the total gear reduction for both fast and slow ratios. Two large, heavy-duty helical gear sets provide the *second step*. Both sets are of balanced size and capacity. One set (No. 2) is for fast speed; the other (No. 3) is for slow speed. The clutch collar (No. 4) power shifts to right or left to engage one helical pinion or the other.

Greater endurance, longer truck life with TDA. TDA's simple design eliminates small complicated parts and midget size gears. Large hypoid-helical design provides more teeth in contact – quieter operation and far less strain. Bearings are larger, too. All this adds up to more profitable operation under all conditions.

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TIMKEN AXLES

Increase axle life with
GENUINE TDA EQUIPMENT PARTS

Take no chances with ordinary replacement parts. For sure, dependable, factory-type jobs, specify genuine Timken-Detroit Axle parts kits—identical to your axles' original equipment.

Each kit is complete—gives you everything you need in one handy package. Gaskets and shims, brake liners and rivets, steering knuckles, king pins and bushings, differential nests—for every size of brake and axle. Order by number from your dealer. Cut labor and adjustment costs. Get trucks back on the road quicker.

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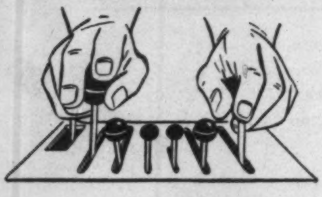
K-580 SHOVEL MOVES ROCK FASTER—operator works with greater speed and safety because of greater "live" weight built into every Link-Belt Speeder. All-welded, stress relieved construction gives greater strength per pound. Alloy cast-iron clutch shells assure superior friction, longer lining life. Independent rapid boom hoist has power control up *and* down.

Now every Link-Belt Speeder shovel-crane has *Speed-o-Matic*®

—no lag, no jerk, no strain—

IT'S FULL POWER HYDRAULIC CONTROL



Today Speed-o-Matic controls are *standard equipment* on every size rig in the entire Link-Belt Speeder line! Full power hydraulic control is your key to 25% extra production . . . more consistent profits in the ½ to 3-yard, 6 to 60-ton work range. Here's why:

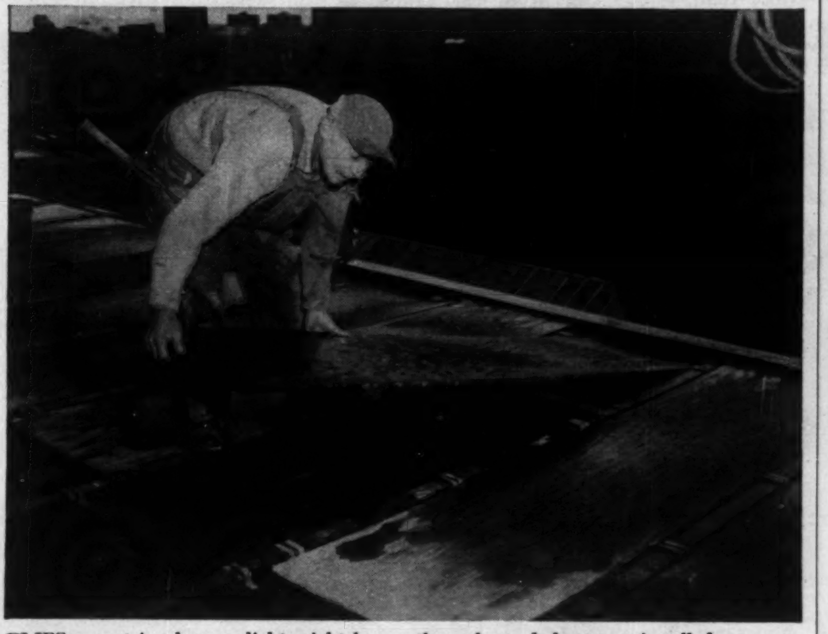
- REDUCED OPERATOR FATIGUE—fingers, instead of muscles, put full power to work.
- SMOOTHER CYCLES—complete cycle is one fluid motion.
- MORE ACCURATE CONTROL—operator always safely *feels the load.*
- REDUCED CLUTCH ADJUSTMENTS—clutch piston is self-compensating for normal lining wear and heat expansion.
- 150 WORKING PARTS ELIMINATED—maintenance costs cut.

Join thousands of alert owners who are making more money with Link-Belt Speeders. Contact your Link-Belt Speeder distributor for details. LINK-BELT SPEEDER CORPORATION, Cedar Rapids, Iowa.

13,731

LINK-BELT SPEEDER

Builders of a complete line of crawler and rubber-tired shovel-cranes



CLIPS are set in place on lightweight beams then plywood sheets are installed.

K System Makes Form Stripping a Snap

Use of a two-ounce cast iron clip with lightweight steel structurals is saving a New York builder a pot of money on his forming costs. The 3-in. clips slip over the top flange of the steel beams to support plywood forms. When the placed concrete has set, a sharp rap snaps the clip and the plywood drops out.

The K system, as it is called, is reported to have saved an estimated $90,000 in the construction cost of a 12-story apartment building in New York City. Immediate plans call for eight more apartment houses to be built with the same method.

According to the developer of the system, the saving was the result of cutting an estimated $1 per sq ft off the cost of the concrete flooring. Actual cost was said to be about 45 cents to 50 cents per sq ft.

Not only is the system said to save time and materials, but it is reported to give the structure additional rigidity because the clip allows the concrete to come below the top flange of the Junior beam.

Most of the beams used on the job were 16 ft long and placed about 2 ft apart. When the concrete was about to be placed, a workman went along the beams and installed a clip approximately every 2½ ft. Then, two precut 8-ft plywood sheets were set between the beams. A single layer of welded wire mesh was used to reinforce the 2-in. layer of concrete.

After the concrete had set, the exposed part of the clip was knocked off. Although the clip sustains a heavy normal load, it cannot take a shock blow. When the clips had been broken, the plywood sheets dropped

CLIPS will support heavy loads of concrete but will not take sharp, shock loads.

TAMPS 25 FEET PER MINUTE!

Contractors Save Time And Money On Ohio Turnpike with "Form Tampers"

In just a few hours one man with a FORM TAMPER can tamp and oil the forms for the full day's run! And the FORM TAMPER does a better, more uniform job of tamping than can be done by hand. Result: a smoother concrete surface at lower cost—in less time.

SEND COUPON NOW FOR INFORMATION ON . . .

- FORM TAMPERS
- FORMGRADERS
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- STRAIGHT EDGES
- SUBGRADE SCRATCH TEMPLATES

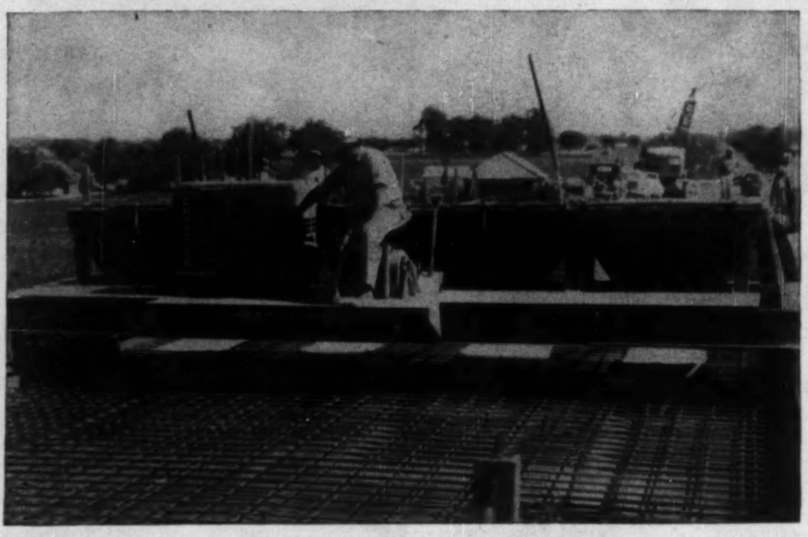
THE CLEVELAND FORMGRADER COMPANY

Mills Road, Avon, Ohio
☐ Send literature to:
Name__________
Firm__________
City_____ Zone_____ State_____

down and were reused.

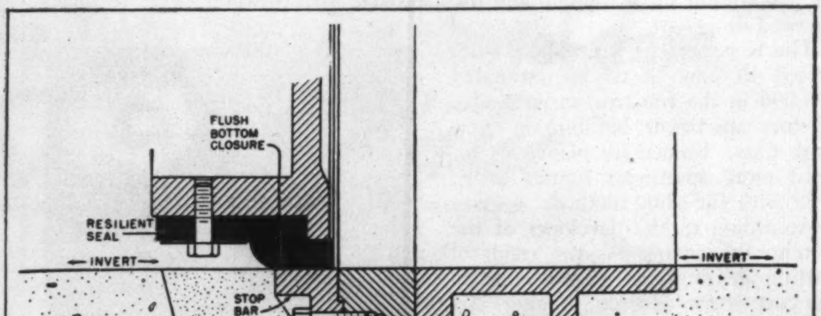
More than 45,000 clips were used in the building—approximately one for every 2 sq ft of construction.

It is planned that the clips will sell for 6 cents to 8 cents each depending on the size. The ones used on the above project were cast by the Crompton Knowles Loom Works, Worcester, Mass.



Carrier Speeds Bridge Concreting

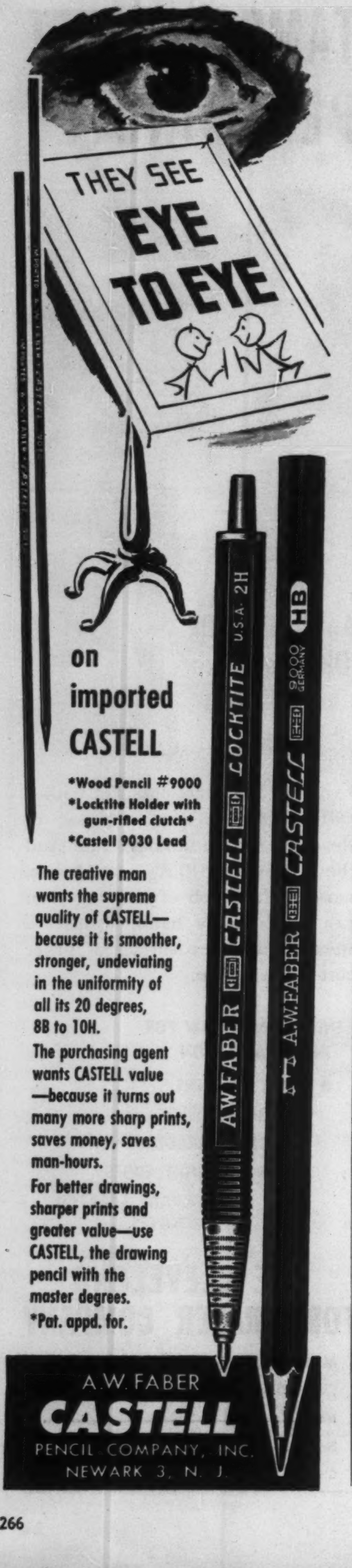
A new type of concrete conveyor car for use in bridge construction is rated at 80 cu yd per hr capacity. Said to be four times faster than the hand buggy method, the unit is reported to have poured a 300-ft bridge deck in half a day. Single-trip capacity of the car is 5 to 6 cu yd carried in four hoppers. The machine weighs 5 tons assembled (engine included) and is self-propelled. It has an 8-ft wide frame and runs on the same track used by the finishing machines. Length can be varied in 6-in. increments. When desired, addition of a vibratory screed permits use of the machine for finishing as well. Two of the cars are now in operation on the Ohio Turnpike. Penn Iron Works, Inc., Reading, Pa.



New Sluice Gate Improves Flow

On the new Hy-Q flush bottom closure sluice gate, the frame has been lowered so that the opening is flush with adjacent chamber floors or with the natural bottom floorline, and the gate seats flush with the invert. It eliminates the barrier which must be built for many gates to seat against or the deep pocket in which wedges

(Continued on page 268)



THEY SEE
EYE TO EYE
A.W.FABER CASTELL LOCKTITE U.S.A. 2H
A.W.FABER CASTELL 9000 GERMANY HB

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*Wood Pencil #9000
Locktite Holder with gun-rifled clutch
*Castell 9030 Lead

The creative man wants the supreme quality of CASTELL—because it is smoother, stronger, undeviating in the uniformity of all its 20 degrees, 8B to 10H.

The purchasing agent wants CASTELL value—because it turns out many more sharp prints, saves money, saves man-hours.

For better drawings, sharper prints and greater value—use CASTELL, the drawing pencil with the master degrees.

*Pat. appd. for.

A.W. FABER
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PENCIL COMPANY, INC.
NEWARK 3, N. J.

"GREAT" for all-around utility work

says Supt. on Garden State Parkway contract

On their 14 mile section of the Garden State Parkway in Cape May County, New Jersey, Public Constructors, Inc., Pleasantville, are using a 19 mph rubber-tired Tournatractor for all-around utility work.

This 208 hp tractor works all over their widely-scattered 2¼ million-yard sand job. It often moves ahead of the company's 33 scrapers to clear trees and brush and handle pioneer dozing. At times, it is used to level cuts and fills and to doze around bridges and culverts. Because of its speed and maneuverability, tractor-on-rubber performs these utility assignments without interfering with production dirtmoving.

Besides leveling work, Tournatractor is also used to push-load some of the contractors' 11 C Tournapulls. Where material is pure white sand, tractor's fast pusher-service loads the 16-yd. "C's" in as little as 45 seconds.

Used for other scattered jobs

Tournatractor is always ready for emergency calls, too. Jobs 5 miles away can be reached in 20 minutes (or less) due to its 19 mph speed. Cleaning haul roads and dozing fill on distant sections of the job are handled quickly and efficiently. Paved highways present no travel problems for the tractor-on-rubber. It goes everywhere under its own power . . . needs no blocking, planking, trailer-loading and unloading. For all around utility service, it "gives a great performance day after day," says Supt. John Franks.

Discover for yourself why the fast, mobile Tournatractor is ideal for utility-type assignments, as well as major tractor work. Phone or write for a demonstration on your job, today. There's no obligation.

Tournatractor, Tournapull—Trademark Reg. U.S. Pat. Off. T-837-H-b

Tournatractor, with its 4-wheel drive, push-loads 16-yard C Tournapull in 45 to 60 seconds. Big low-pressure tires provide plenty of traction and flotation even in this poor, sandy footing.

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

must descend.

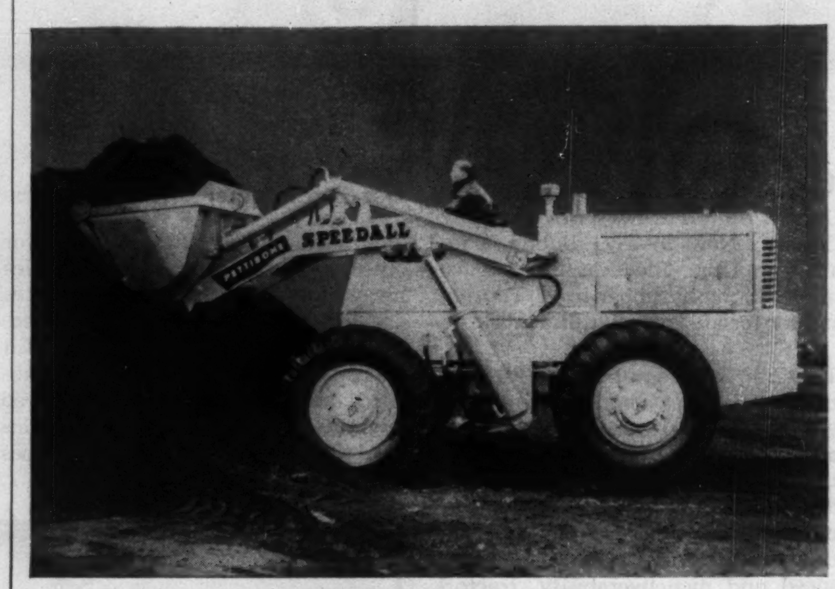
On a conventional gate, wedges are on top, bottom and sides to force the disc tightly against the frame. The wedge system at the bottom must extend below the clear opening; the gate must slide down past a vertical wall barrier built square across the channel and projecting above the invert, or the bottom of the gate and the bottom wedges must drop below the invert in a pocket formed in the floor of the channel.

Like most sluice gates, the Hy-Q gate is of cast iron bronze-mounted construction. It is secured in its closed position by heavy bronze wedges on top and sides which hold it tight against the frame. However, the Hy-Q carries on the bottom of the gate disc a heavy strip of flexible neoprene. When the gate is closed, the neoprene flexes and provides a seal which compresses on the stop bar.

This design allegedly provides the benefits of narrow and broadface contacts on the sealing surface, and it can be adapted to both unseating and seating pressure conditions and to all types and sizes of cast iron bronze-mounted sluice gates.

An important feature of the gate is that it is not necessary to sacrifice up to 18 in. or so of the bottom of the channel with the concrete barrier required by conventional sluice gates. The head developed by additional effective depth of water can be an important factor in controlling flow. The Hy-Q gate, installed flush with the invert, uses all the water pressure available, and this type of installation permits extra headroom and space for gate and stem travel in indoor and underground locations.

According to the manufacturer, because of the greater head available, a smaller gate size, narrower channel and lower channel walls will sometimes serve for a given volume of flow, thus there can be substantial economies in concrete construction work. Rodney Hunt Machine Co., Orange, Mass.



Speedall Shovels Get Power Shift

Power-shift transmission, torque-converter and four-wheel drive through planetary axles are features of the new adidtions to the Speedall tractor-shovel line. 1¼, 1¾ and 2½ cu yd units supplement the standard four-wheel drive Speedball units with torque converter. On the power-shift units the clutch pedal has been eliminated and two levers on the steering column shift the machine four speeds forward and four speeds reverse. The transmission provides a reverse speed that is 30% faster than the corresponding forward motion and this is said to reduce clutch wear by one-half in a majority of operations. The bucket is designed for 30-deg rollback and an automatic device levels the bucket as it is raised. Each of the new models is available with either a gasoline or diesel engine. Machines equipped with General Motors diesels are also equipped with Allison torque converters. All models have power steering and four-wheel hydraulic-vacuum booster brakes. Pettibone Mulliken Corp., 4700 W. Division St., Chicago, Ill.

Mall
POW'R TROW'L
Finishes Concrete
FAST, EASILY, ECONOMICALLY
4 POWER HEADS
4 cycle gas engine
2 cycle gas engine
electric motor
pneumatic motor
Before you Buy Check all these New Features

- New safety throttle control. If handle slips from hand, ring automatically stops and engine idles.
- New lifting eye-hook for raising or lowering machine from one floor to another.
- New clamp ring permits changing of power heads in seconds.
- New automatic recoil starter—fast and easy—no lost rope, no waste of time.
- New direct gear transmission delivers 97% of power to the blades.
- New quick-kick ring—a mere kick adjusts pitch of all three blades at once.
- New extra strong ⅝" diameter solid ring in 26", 36", and 45" sizes . . . all easily interchangeable.
- New reversible shoes and blades. Both edges can be used—gives double wear.
- Powers floating disc for dry tamp floors and grinding-grouting head.

SEE FOR YOURSELF—Phone or write the MALL office nearest you for a free demonstration. Do it today!

MALL TOOL CO. PORTABLE POWER TOOLS Gasoline • Electric • Air
7730 S. Chicago Ave., Chicago 19, Illinois
Send me a colorful descriptive folder on the new MALL POW'R TROW'L.

Name __________

Company __________

Address __________

CU-178

3 jobs at once

with *one* Tournapull

Partner W. P. Bouler, Mobile, Alabama, estimates sideboarded "D" often carries 7 loose yards of clay . . . in higher-void dirt, probably averages 5½ to 6 yards.

▲ "D" shaped backslopes while grading roads around the subdivision. Making thin cuts about 150 ft. long, Tournapull consistently loaded in about 1 minute with help of 90 hp pusher.

Speed and mobility of their 7 yd., 28 mph "D" enabled Williams & Bouler, Mobile, Alabama, to maintain continuous production on jobs 12 miles apart. Here are the jobs:

1. Move 50,000 cubic yards of clay for Mauvilla Forest Estates Subdivision in Chickasaw, a suburb of Mobile. Job included leveling area, and grading 1½ miles of rough roads.
2. Move 15,000 cubic yards of sand on housing project nearby.
3. Assist in construction of 3 miles of highway known locally as "the Snow Road."

All 3 jobs done at same time, with "D" traveling to job No. 2 and job No. 3 whenever clay at Mauvilla got too wet from rain or whenever dirtmoving got well ahead of schedule. "D's" ability to travel fast over main highways was especially important, because one of its assignments, the Snow Road job, was 12 miles from the housing sites.

2000′ cycle every 3½ minutes

High speed paid off in high output, too. Engineer's time studies made on the Chickasaw housing site show the "D" completed typical 2000′ cycles every 3½ minutes (this included time to spread around trees left standing to beautify some of the housing sites). Loads in the heavy clay varied from 5½ to 6 pay yards. Output averaged 15 trips (82 to 90 pay yards) per 55-minute hour. This performance enabled the "D", working part-time, to move half the total yardage, while a larger crawler-scraper team, working full-time, handled the other half. Had both machines worked full-time on this one job, Partner W. P. Bouler estimates the D Tournapull would have moved "2 to 3 times as much dirt as the crawler and pan!"

See for yourself how this high-speed, versatile Tournapull can put profits into *your* scattered jobs, either as a self or pusher-loaded tool. Call today to arrange time and place for a demonstration. No obligation, of course.

Despite need to maneuver around trees, Tournapull completes typical 2000′ cycles every 3½ minutes. ▼

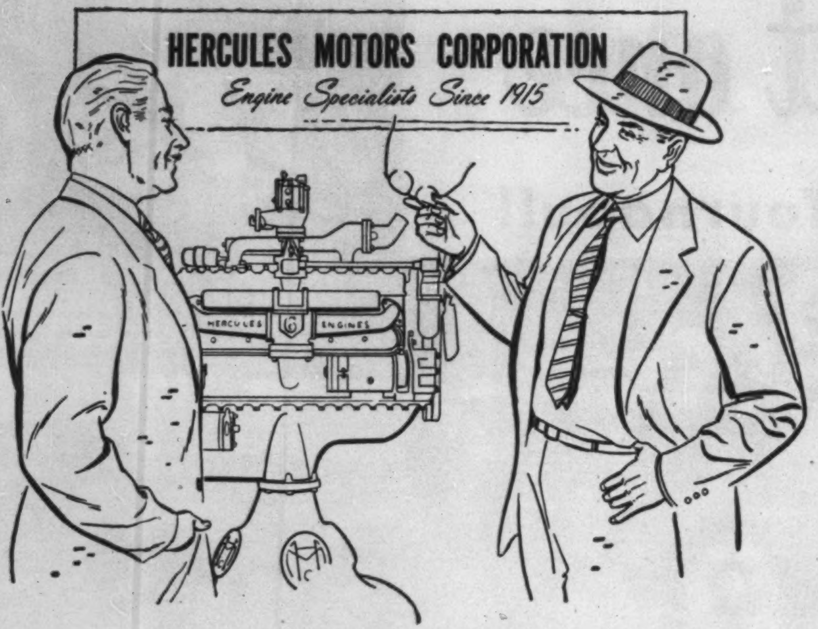
Tournapull—Trademark Reg. U.S. Pat. Off. DP-803-H-b

LeT W

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



It May Cost a Little More to Buy the Best
But **HERCULES ENGINES give you**
So Much More **for your money.**

● (1) Long-life service . . . not just an idle statement. Many HERCULES ENGINES 5, 10, and 15 years old are still delivering dependable day-in, day-out power. (2) Engines designed to-the-application . . . granted, we have over 90 standard models but they are not off-the-shelf items. HERCULES ENGINES are custom-produced to specifications of the equipment. (3) Gasoline or Diesel . . . many models of gasoline engines have similar mounting dimensions as diesel engines of like displacement. (4) Wide selection of fuels . . . HERCULES ENGINES operate efficiently on any popular fuel available, permitting the use of the most economical fuel in your area . . . gasoline, diesel fuel, natural gas, kerosene, L.P.G. and others. (5) Lightweight, heavy-duty construction . . . the excess metal that adds to engine weight has been eliminated . . . all 6 cyl. engines have 7 bearing Tocco hardened crankshafts, large precision-type bearings and full length water jackets are some of the extras which are standard on HERCULES ENGINES.

These are but a few of the features that make HERCULES ENGINES a better buy. For more complete information on the wide selection of Hercules Engines and Power Units, write for a copy of the folder, "Hercules Engines." This lists the many sizes of engines and their power ratings.

HERCULES ENGINES
HERCULES MOTORS CORPORATION
40 Years of Engines for Industry
129 Eleventh Street, S. E. • Canton, Ohio

PUBLICATIONS

• **Mechanical Joint Pipe and Fittings**—A new 32-page booklet entitled "Warren-Spun Mechanical Joint Pipe and Fittings" provides detailed methods of installation, standard dimensions, thicknesses and weights and a table of standard sizes, classes, thicknesses and weights of mechanical joint pipes available from the company.

Step by step photos show the method of installation while following pages describe this operation textually. Included in this section are instructions for preparation, bolt torque data and tightening the joints.

Four pages of the booklet are devoted to standard specifications while another two pages describe in tabular form the pipe available.

Also included are drawings and tables of sizes for such accessory items as bends, tees and crosses, reducers, offsets, sleeves, connecting pieces, glands, plugs and caps, drip pots, gaskets and bolts and nuts.—WARREN FOUNDRY & PIPE CORP, 55 LIBERTY ST., NEW YORK 5, N. Y.

• **Concrete Masonry** – Two booklets are available for those interested in concrete masonry and its applications.

One, entitled "Concrete Masonry Comes of Age", was written by Mr. William M. Avery, editor of Concrete. This presentation is liberally illustrated and begins with a general introduction followed by description of the concrete masonry products available. Homes of concrete masonry are broadly described and included in this section are items pertaining to the strength and durability, fire resistance, insulation value and economical considerations of concrete masonry. This booklet is offered by the BESSER CO., ALPENA, MICH.

The second booklet is entitled "Beautiful Walls with Concrete Masonry". This publication is liberally splashed with color illustrations and contains brief descriptions of each installation. This 16-pager is published by the PORTLAND CEMENT ASSN., 33 W. GRAND AVE., CHICAGO 10, ILL.

• **Drill Bits**—A general catalog covers the line of Hoffman "oriented diamond" drill bits. Diamonds in the crowns of these bits are set at predetermined angles to expose the hardest, sharpest cutting surfaces to produce bits that are said to cut faster and last longer.

The catalog lists sizes, setting charges, weights, uses, etc. for all standard bits. Among the items described and priced in the booklet are

LETOURNEAU-WESTINGHOUSE

3 big capacity "C" Rear-Dumps handle tough rock haul

One of the toughest problems Wes-Julian Construction Corp., Dedham, Mass., encountered on improvement of Hanscom Air Force Base near historic Lexington was removal of a 100,000-yd. mound of solid granite known as Mew Hill. Located near the junction of the existing runway and the proposed extension, this hill posed a serious danger to jet planes using the strip. It also blocked construction of parking areas and prevented direct access to the field from machine and repair shops. Having successfully used Tournapulls on scraper dirt for several years, contractors turned to LeTourneau-Westinghouse equipment to solve this problem, too. Haulers chosen were 3 C Tournapull Rear-Dumps.

Solving a rock hill problem on $3,885,000 Air Base job

Rear-Dumps usually were loaded in 4 to 5 passes of 2½-yd. Northwest shovel. Each load averaged 18 tons. Because one "C" carried as much as could 3 to 4 average dump trucks, often used on jobs like this, Wes-Julian needed fewer haulers and fewer operators. All-steel body construction also reduced maintenance. Capacity of this Model "C" Rear-Dump, without sideboards, is 18 tons. Newest "C's" carry 22 tons.

Leaving the shovel, these Rear-Dumps accelerate quickly... go rapidly over both well-maintained haul road and soft fill. Runway is being extended 2300'. Pavement will be 200' wide with 200' shoulders on either side. Several 75' wide taxiways to be constructed include one 1000' long and another 1500' long. At the eastern end of the 150 acre air field job, Wes-Julian will also construct a 250' long blast pad.

Fill is dumped at end of runway extension. Note how body swings below and behind rear wheels. This keeps material from piling under unit... combined with front-wheel drive, allows safe dump over edge of fill or steep banks when necessary. When Mew Hill has been leveled, Rear-Dumps will haul another 100,000 yds. of rock, hardpan, peat, and clay from other borrow locations to grade for 6 miles of connecting highways.

Turning to dump in tight quarters of this ditch is no problem for C Tournapull Rear-Dump. Despite overall length of 29', "C's" can make non-stop 180° turn in space only 27' wide. In dump position, this remarkable unit requires only 21' for a non-stop U-turn. Steer works independently of footing through geared kingpin that connects trailing unit with prime-mover.

Tournapull—Trademark
Reg. U.S. Pat. Off. R-746 H-b

For more information on Tournapull Rear-Dumps (or interchangeable scrapers and bottom-dumps) please write or call:

LeTourneau-Westinghouse Company
PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

The man behind the gun will tell you . . .

WHITE GIVES YOU

greater, longer-lasting precision–

Shown, model 7014 with "A" standard. Sold complete with tripod case and field equipment. Model 7020, same unit with "U" standard, also available.

. . . yet costs less than other quality engineers' transits

LIKE every White quality-built instrument, these engineers' transits give you greater dollar-for-dollar value than any other comparable unit.

For example: White uses a recently-developed Swiss Dividing Engine to cut graduations into solid silver. This insures super-precision from the beginning, safeguards it through more years of hard field usage.

In addition, White engineers' transits give you internal focusing, covered leveling screws, and coated optics. These and a host of other design and operating features combine to give you a transit unsurpassed for ease, speed, accuracy, economy and long-lived dependability. Write for Bulletin 155 and the name of your nearest dealer. DAVID WHITE COMPANY, 317 W. Court Street, Milwaukee 12, Wisconsin.

White Coated Optics give you an image like this...

not this

Even at long distances under adverse weather conditions, you get a clear, sharp image — without halation.

DAVID WHITE COMPANY

We offer expert REPAIR SERVICE on all makes, all types of instruments.

concave and pilot bits, tapered step-type non-coring bits reaming shells and laboratory or thin faced bits. HOFFMAN BROS DRILLING CO, PUNXSUTAWNEY, PA.

- **Aluminum Bridge Railings**—In this book 52 pages are used to show designs which use aluminum most efficiently—designs that require the minimum amount of material and work, yet provide the maximum in strength, rigidity, and pleasing appearance.

Updated from last year's version, the 1955 issue contains an entirely new section devoted to associated highway accessories. Among recent developments in this field are standard aluminum blanks for highway route signs and markers. Another development is the use of aluminum honeycomb panels with a core of resin impregnated Kraft paper for light yet rigid panels for large signs marking exits, entrances, towns and distances.

The newest development is an extruded aluminum interlocking sign panel which can be assembled to any size desired by using standard elements in 6 or 12-in. widths, available in lengths up to 30 ft. The panels are attached to supporting posts by hooks or J-bolts without drilling holes in extruded elements.

Another feature of the 1955 edition is that reference and mill die numbers are listed along with all extruded shapes for ready identification.

The book includes a study of architectural considerations, complete design details, recommendations for joints, endings and post settings, surface treatment and insulation. Bridge railings in use are presented in detail with diagrams to show joining and mounting methods, cross sections of shapes employed with a full bill of materials required per section of railing.

The design studies include a structural analysis of a typical railing as well as information for calculating deflection and impact values. A table compares aluminum railings with steel under impact loadings within the elastic limit.

Other tables in the new manual present data on allowable unit stresses for various aluminum alloys for railings and posts, for bolts and nuts and for welded connections; mechanical properties of aluminum alloys for structural rail members. The new aluminum alloy designation system is used throughout the book.

Cost studies show weight per running foot and comparative cost for

(*Continued on page 275*)

65,000 yds. of clay and sand per week

for 3 "C" Tournapulls

To speed relocation of 13 miles of State Highway 25 north of Howard, South Dakota, Pasco Construction Company, Sioux Falls, assigned 3 C Tournapulls 95% of all dirtmoving.

According to Owner Owen Pasco, the 3 "C's" moved a combined total of 65,000 pay yds. per 120-hour week on hauls averaging 800 to 1000 ft.

At this production rate, Pasco finished 500,000-yard job in 2 months.

Timed by field engineers on one 2400′ cycle, each of the 3 Tournapulls averaged a cycle every 3.75 minutes. Despite soft footing which made for tough going in borrow pit, load time varied from .75 to 1.0 minutes for 13 pay yards of sand and clay. Combined output for the 3 units was 40 loads (520 pay yards) per 50-minute hour.

1,500,000 yards per season

Says Pasco, "Our 'C's' did a very good job for us. We had no trouble to speak of. I don't think there is anything that can compare with our LeTourneau-Westinghouse equipment. In one season, our 3 Tournapulls moved 1,500,000 cubic yards."

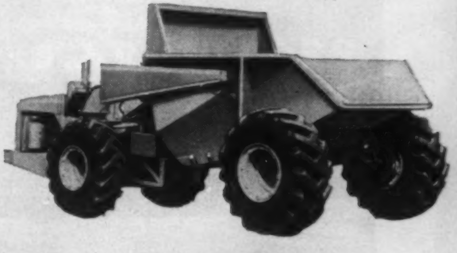
Adds Mechanic Ralph E. Durfee, "Our 'Pulls are giving us very good service. They operate very easy, and I can make repairs and adjustments in short order as it is so easy to get at the different units."

For all-round performance under a wide variety of conditions, it will pay you to investigate Tournapulls. Why not have a demonstration on *your work?* Call us to arrange time and place. There's no obligation.

Loads weighed on the job

Time study production given in this report is based on a conservative estimate of 13 pay yards per load. Yet, men on the job report that weight tests made several times by engineers from a competitive manufacturer shows Tournapulls regularly scaled payload of 16½ yds.

Tournapull spreads load in 17 seconds. Jobs previously handled by the "C's" include 400,000-yd. 4-mile contract on Highway 77 near Del Rapids, and 465,000-yd. 13-mile highway contract at Desmet. When moving job-to-job, Tournapulls tow large shop trailers. Units made the 80 miles from Desmet to Del Rapids in 4 hrs.



Insure your future

For less than 25% of the cost of the original unit, you can get an 18-ton Rear-Dump hauler to interchange with the Tournapull Scraper. You save money because all you need buy is the rear-dump body . . . rear wheels, tires, and brakes may be interchanged.

Tournapull—Trademark Reg. U.S. Pat. Off. P-582-H-b

LeTourneau-WESTINGHOUSE Company
Peoria, Illinois
A Subsidiary of Westinghouse Air Brake Company

PLACING CONCRETE
SETTING STRUCTURAL STEEL
HANDLING MATERIALS

These Bucyrus-Erie Crane Features Help You On Every Phase of Building

Maximum Stability- A low center of gravity and long, wide-spread crawler units give Bucyrus-Erie cranes a firm footing for the safe handling of long booms. This kind of stability enables operators to work rapidly.

"Full-Feel" Control- Direct-connected controls give operator unequaled "feel" of the load. Big clutches are instantly responsive, smooth in action, provide utmost load-handling safety, let the operator "inch" load accurately up or down.

Independent Boom Hoist- Boom hoist on Bucyrus-Erie cranes is independent of all other functions . . . is available instantly for boom angle changes. Lowering speed is power-controlled.

Simple Jib Extension Connections- Jib extensions can be connected without removing sheaves, guards, suspension ropes or any of the boom-point machinery.

See your Bucyrus-Erie distributor for complete information on cranes with boom lengths up to 120 feet. Jib extensions are from 10' to 30' long. Crane capacities are variable depending on length of boom, size of crawler mounting, and counterweight used.

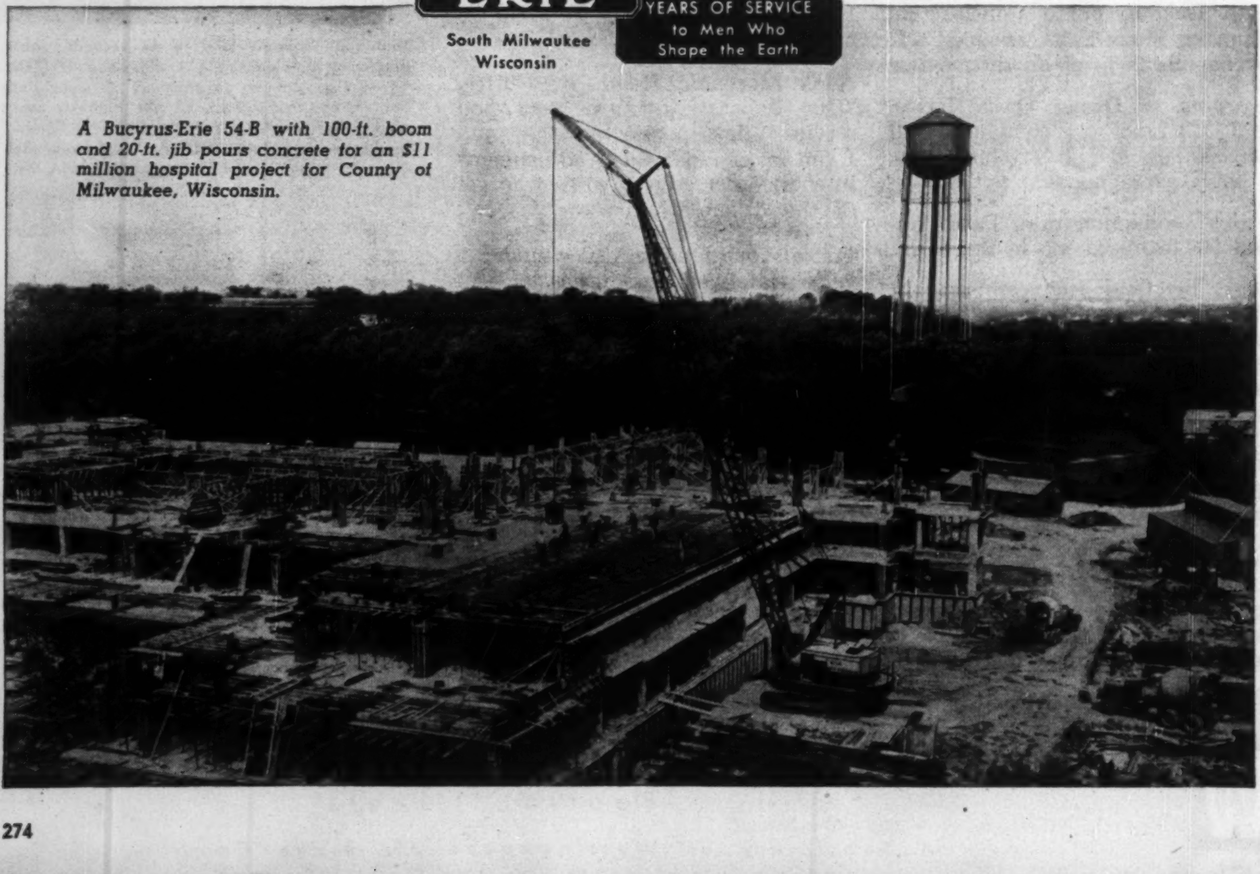
153E55

BUCYRUS ERIE

1880 75 1955

YEARS OF SERVICE
to Men Who
Shape the Earth

South Milwaukee
Wisconsin



A Bucyrus-Erie 54-B with 100-ft. boom and 20-ft. jib pours concrete for an $11 million hospital project for County of Milwaukee, Wisconsin.

complete aluminum bridge railings of four typical designs detailed in the book. The section also includes comparative prices and properties of the extruded aluminum members.

Guide specifications presented in a separate section cover materials for cast posts and fittings, extrusions, fasteners, pipe, rods and bars, sheet and plate, drawn and extruded tube; their storage on the site, and their condition as to straightness and finish. Fabricating operations covered include bending, cutting, drilling and punching holes, reaming holes, drifting holes, riveting, bolting, welding and expanding. A chapter on all-aluminum lighting standards is also included. 117 illustrations and 23 tables are included. DESK PR, REYNOLDS METALS CO., 2500 S. THIRD ST., LOUISVILLE 1, KY.

• **Scales**—A 4-page folder describes the manufacturer's various types of suspension hopper scales which are used for mixing, proportioning or batching of various ingredients in many fields. Available in capacities from 500 to, and including, 100,000 lb, the units can be adapted for square, round or rectangular hoppers. Among the uses for the hopper scales is included the batching of concrete.

The scales are of all steel construction, featuring hardened steel pivots and bearings. According to the brochure, they can be equipped with dial indicators or with weigh beams as desired. The brochure describes and illustrates a variety of styles and sizes of scales used. THE WEBB CORP., WEBB CITY, MO.

• **Tables and Data**—A new booklet entitled "Selected Scientific and Engineering Tables and Data" contains selected chemical and physical, engineering, plastic, and other tables and charts arranged for easy reference.

Included in the chemical and physical section is a short glossary, tables of weights and measures, decimal equivalents, conversion tables, and composition and constants of fats and oils.

Under the engineering section are wire and sheet metal gages, weights of various materials, physical properties of metals, hardness scales, wire tables, steel pipe dimensions, air infiltration through windows, conductivity of insulation, electrical conductivity of metals, etc.

In the plastic section there is contained a plastics glossary and a table of properties. UNITED STATES TESTING CO., INC., 1415 PARK AVE., HOBOKEN, N. J.

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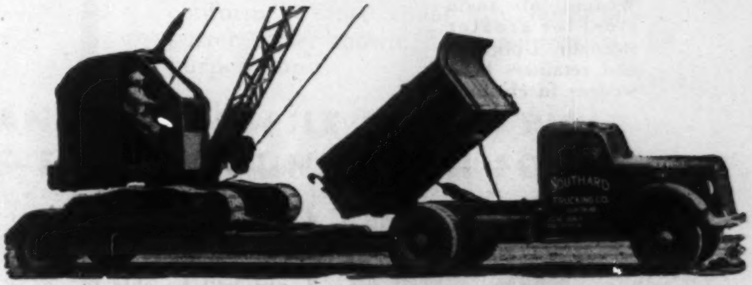

Attaching of loaded Rogers Tagalong trailer

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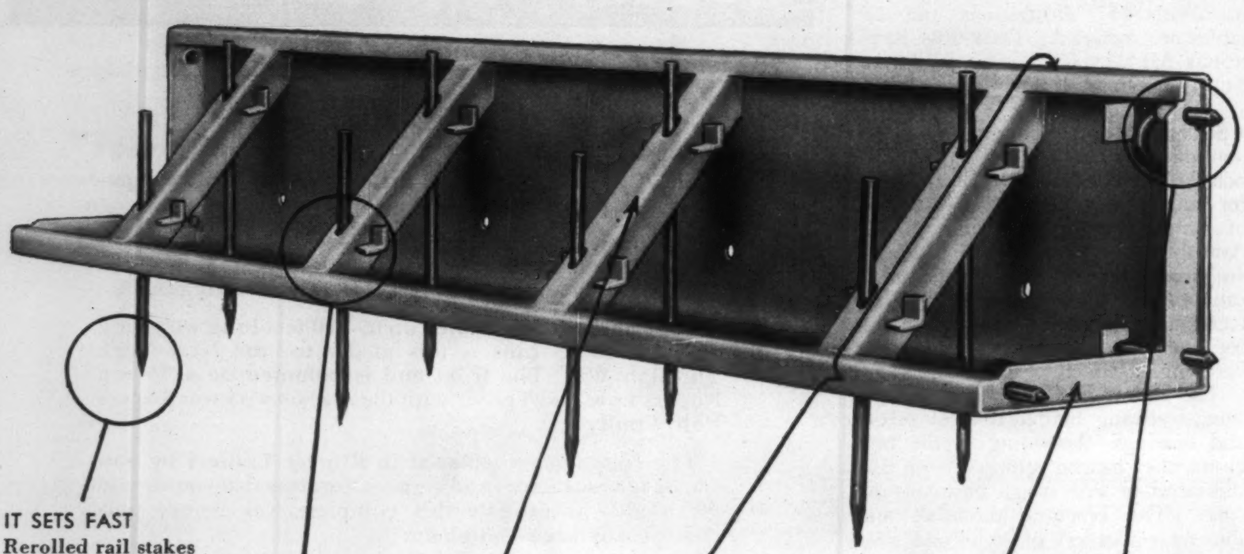

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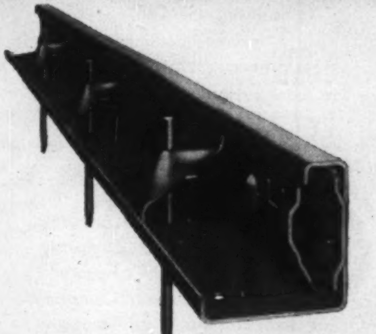

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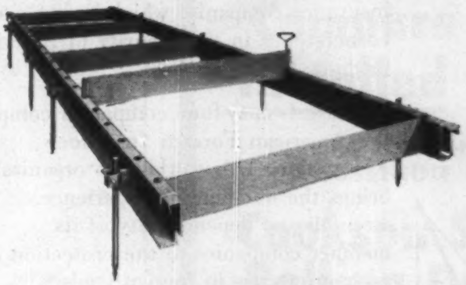

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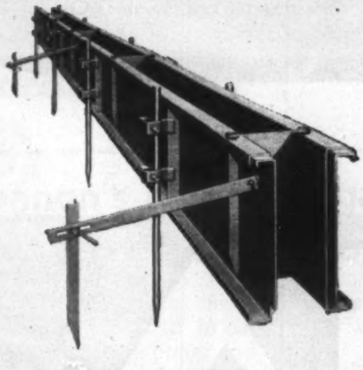

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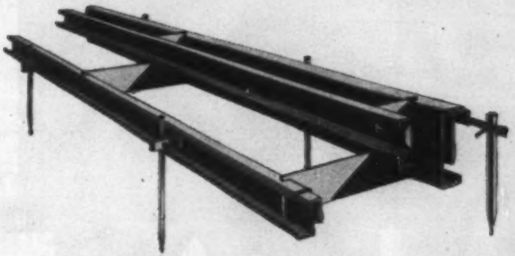

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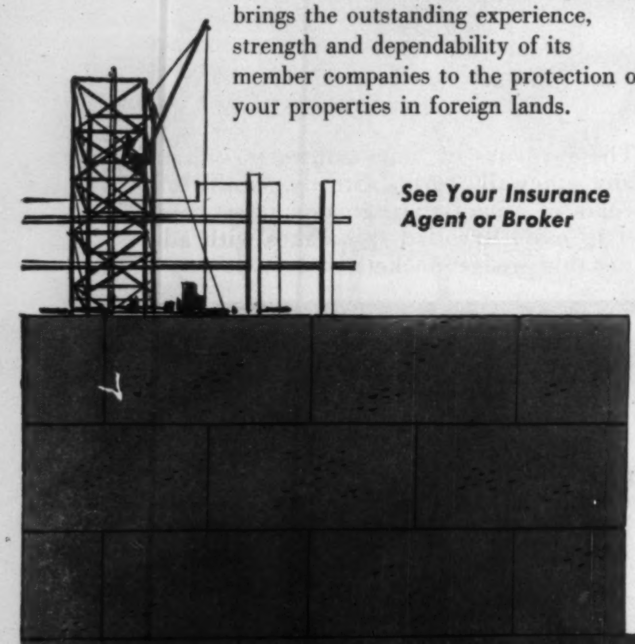

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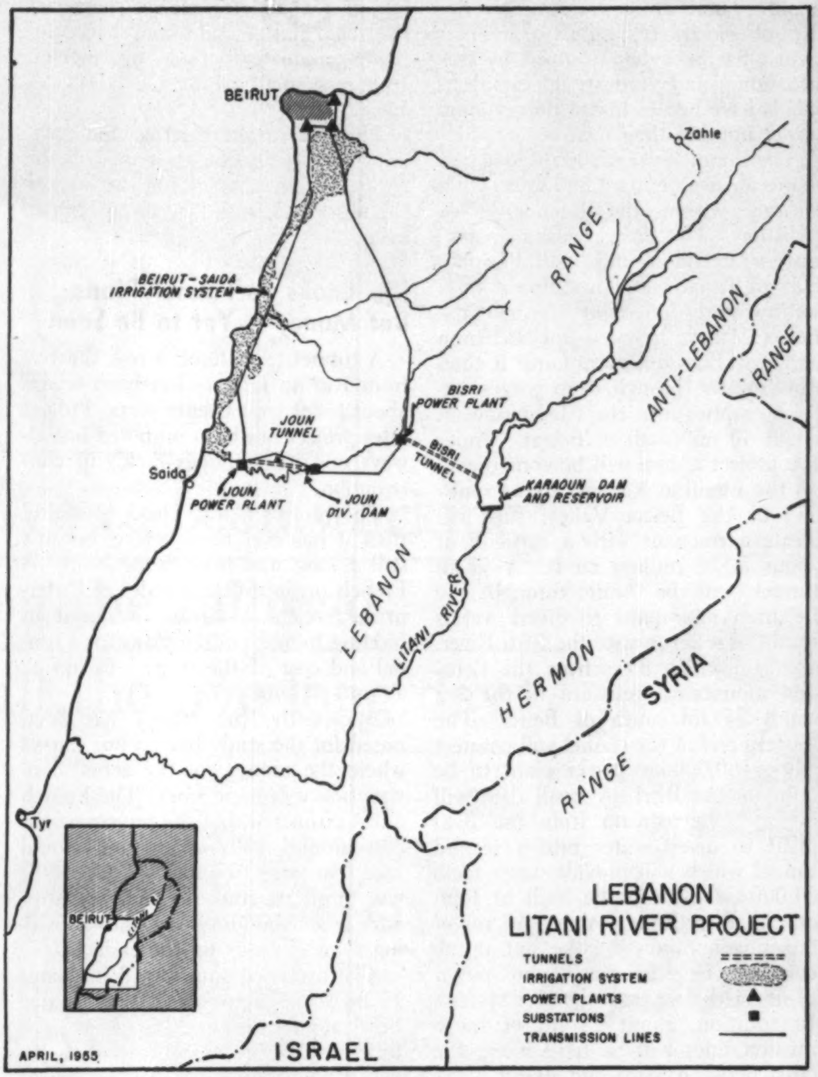
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LITANI RIVER PROJECT
TUNNELS
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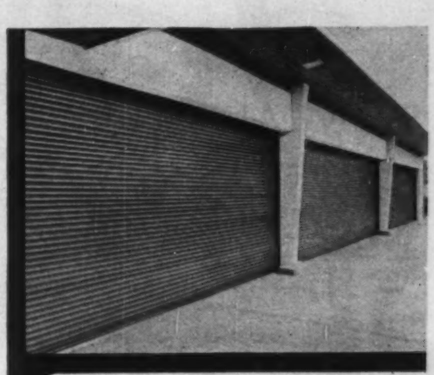
Lebanon's Hydro-Irrigation Scheme Backed by $27-Million from World Bank

The World Bank has made a loan of $27 million to assist in financing the construction of a power and irrigation project on the Litani River in Lebanon. The project will more than double present electric generating capacity in Lebanon and relieve the power shortage which has existed for the past ten years, particularly in the Beirut area. It will also permit the irrigation of 8,500 acres along the Mediterranean coast.

The loan was made to the Litani River Authority, an autonomous government agency established in 1954 to execute construction of the project. The Authority has retained engineering consultants to plan and supervise the project, and will itself manage and operate the power and irrigation works when they have been completed.

The Litani River and its tributaries are the largest of the undeveloped water resources in Lebanon. The development of the river basin was studied originally by technicians of the Lebanese Government and during 1951-54 a plan was drawn up by the U.S. Bureau of Reclamation as part of the technical assistance program for Lebanon. The project for which the loan was made is based on the Bureau's plan.

The main purpose of the project is to supply additional electric power in Lebanon. The existing power system is overloaded and has no reserve capacity; private investment in additional



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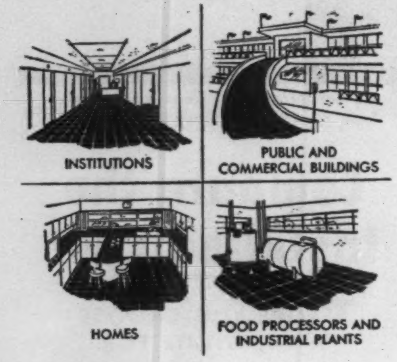
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power capacity has been insufficient to meet the rapidly expanding demand. There are restrictions on the use of electricity; industry in particular has been handicapped by this situation, and industrial establishments have had to install uneconomic power units of their own.

The Litani River is 106 mi long and drains an area of about 860 sq mi lying entirely within the boundaries of Lebanon. The river rises in northeastern Lebanon and in the upper half of its course flows slowly in a southwesterly direction through the Bekaa Valley, between the Lebanon and Anti-Lebanon mountains; it then runs swiftly through deep gorges until it empties into the Mediterranean about 50 mi south of Beirut. Under the project a dam will be constructed on the Litani at Karaon, at the south end of the Bekaa Valley; this will create a reservoir with a capacity of about 2,120 million cu ft. A 5½-mi tunnel will be built through the Lebanon mountains to divert waters from the reservoir into the Bisri River, a stream which flows from the Lebanon mountains westward to the Sea about 25 mi south of Beirut. The western end of the tunnel will connect with a 60,000-kw power plant to be built on the Bisri. A small dam will be built downstream from the Bisri plant to divert water into a second tunnel which will provide water for a 24,000-kw plant to be built at Joun on the Bisri River. About 60 mi of transmission lines will be put up to connect the Bisri and Joun power plants with the Beirut power system. In addition, about 25 mi of transmission lines will be built along the coast between Saida and Beirut.

The irrigation system will be located on a narrow coastal strip running south of Beirut to Saida. The system to be built will use water from the Karaon reservoir directed through the tunnels and canals to the headworks of the Joun power plant, where it will enter the main irrigation canal. This canal will be 35 mi long, reaching to the suburbs of Beirut.

The project is scheduled for completion in 1961, and total cost is estimated at the equivalent of about $40 million. The Bank's loan of $27 million will be used to pay for the services of foreign consultants and contractors and for imports of power generation equipment, transmission lines and substations, construction equipment and some construction materials and supplies.

The local currency requirements equivalent to about $13 million will be provided by the Government in the form of interest-free advances. The earnings of the power system should be sufficient to cover service charges of the loan and, in addition, have surpluses adequate to build up reserves, after repayment of the Government's advances.

The cost of constructing and operating the irrigation system will be covered from charges for the use of the water and from land improvement taxes.

Rio Looks to Tunnel Plans But Money Is Yet to Be Seen

A tunnel to Niteroi, across the bay from Rio de Janiero, has been talked about for at least twenty years. Project after project has been proposed but always one item—money—held up construction.

The project is now closer to reality than it has ever been before, but it's still a long way from being built. A French organization, Etudes et Enterprises Societe Anonyme, won out in bidding to make initial plans for a tunnel and cost of the study will run to around $1-million.

Apparently, the money has been raised for the study but no one knows where the money for the actual construction will come from. The French outfit estimated that the project would cost around $60 million and would take four years to build. EESA says it will finish its study in eight months, after which building can start—providing someone puts up the cash.

The proposed tunnel will be about 1⅞ mi long composed of two parallel tubes approximately 21 ft in dia. The tubes will lie at a depth of 230 ft below the bottom of the bay.

Investigations Begun for Sweden to Denmark Bridge

Seismic investigations of the bottom of Oresund, the sound between Copenhagen and Malmo, Sweden, have been started as a basis for planning a bridge between Sweden and Denmark.

Several projects for a bridge over the Sound have been proposed, but so far no action has been taken. It is possible that the next session of the Swedish and Danish parliaments will see a bill started, which would then go through committee study for a number of years.

The last proposed project called for a bridge over the shortest open water in the vicinity of Copenhagen-Malmo. This distance is 11 mi and ends at the southern tip of an island outside Copenhagen.

We've been working on the railroad all the live long day*

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Fifty-five years of building railroad bridges is some record, isn't it? In fact, there aren't many veteran railroaders who have spent more time on the job than American Bridge!

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If your system is one of the many we have served, you know our work. *You know how completely dependable we are.* If, on the other hand, you have never enjoyed the satisfying relief of having American Bridge handle your bridge building problems, we suggest that you *make a note now* to discuss your needs with us whenever they arise.

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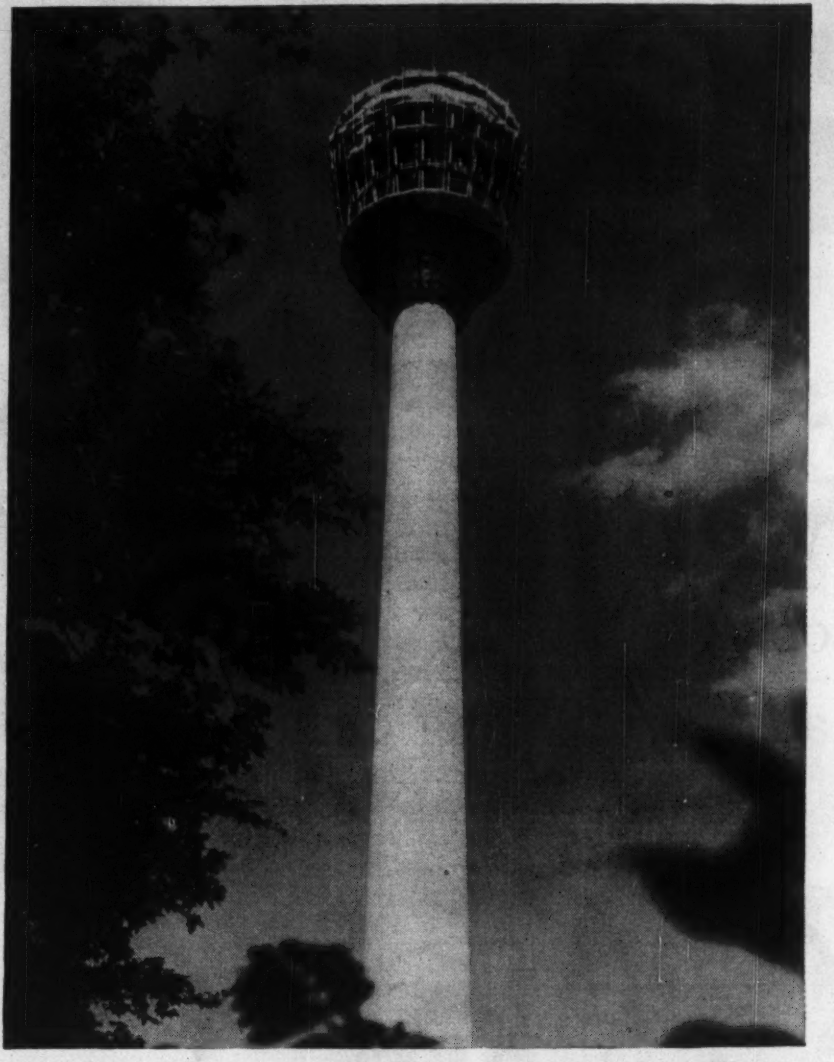


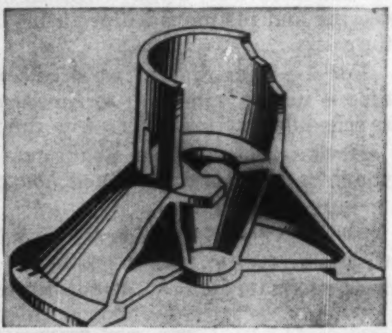
TURRET is located atop the 446-ft concrete tower. Antenna will be added later.

Thin-Shelled TV Tower Rises 702 ft.

A new landmark for Stuttgart, Ger., a 702-ft high television tower will soon have its finishing touches applied. The main part of the tower is a tapered concrete cylinder measuring 446 ft in length. Atop the cylinder is perched a turret which will house a restaurant and further up will be a 184-ft antenna.

The outside diameter of the concrete section at ground level is 35.4 ft while at the base of the turret it is 16½ ft. Thickness of the wall is 23.6 in. at the bottom, 11.8 in. at a height of 33 ft and decreases gradually to 7.1 in. at the top. This relatively thin wall is strengthened by diaphragms spaced at vertical intervals of 33 ft. These diaphragms also support five concrete columns running the length of the tower to which guide rails for the elevators are attached.

The tower rests on two cones—one inverted and placed inside the other. The outer cone consists of a base ring with an outside diameter of 88½ ft and inside diameter of 67.2 ft. Up-



OUTER RING of foundation cone is 88½ ft across. Through 112 radially arranged cables it supports the weight of the tower.

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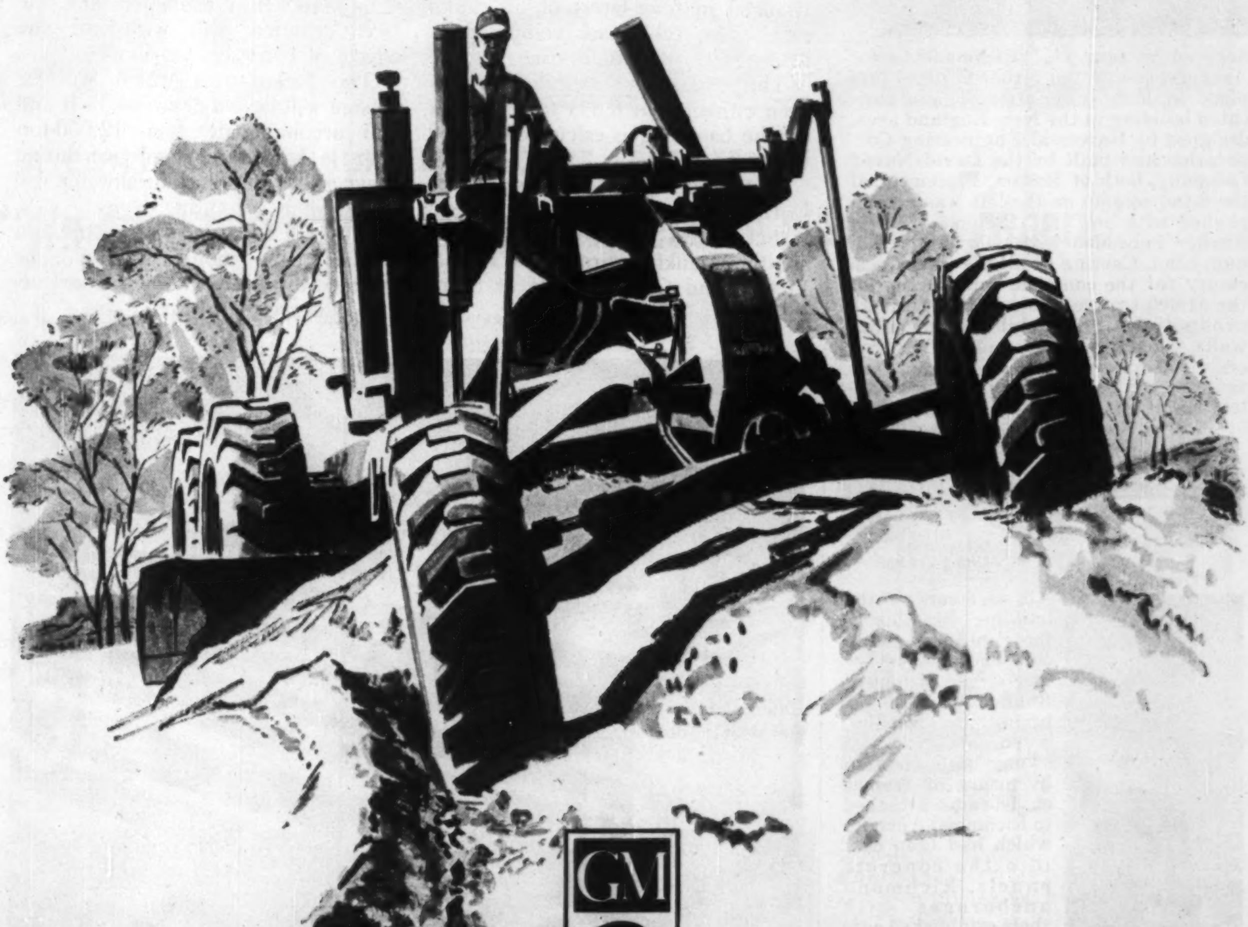
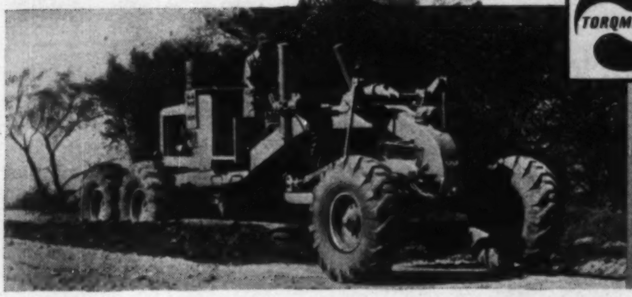
You can get Allison TORQMATIC Converters for both gasoline or Diesel engines from 40 to 400 horsepower—TORQMATIC Transmissions for applications up to 300 horsepower. Get full details on Allison TORQMATIC DRIVES for the equipment you buy or build by writing Allison Division of General Motors, Box 894E, Indianapolis 6, Indiana.





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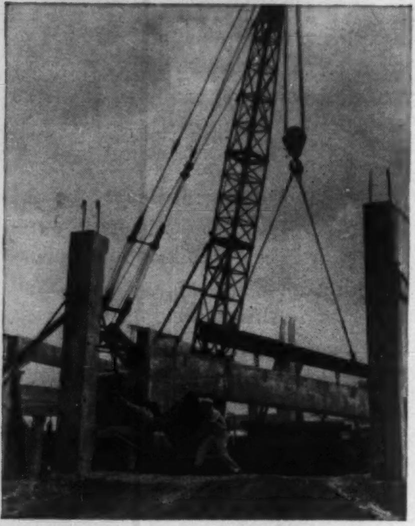

Secured by four 1¼" Richmond Screw Anchors, this 25 ton girder is lifted into place in first fully pre-cast, prefabricated building in the New England area, designed by Universal Engineering Corporation and built by the David Nassif Company, both of Boston. Placement of the 8-ton column on the left was accomplished with one 1¼" Richmond Screw Anchor imbedded vertically in the column head. Casting of all the pieces necessary for the complete construction of the 51,000 square foot building through production-line assembly of pre-cast walls, panels, girders and beams took only six weeks. In all concrete construction work, Richmond equipment guarantees speed and safety.

Screw Anchor and Bolt

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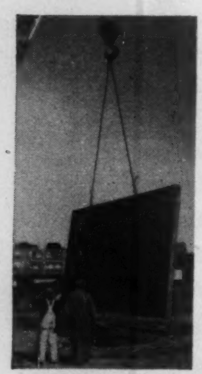

All segments of the building, like this 12 ton panel held in secure check by 4-1¼" and 4-¾" Richmond Spider Anchors for lifting and bracing, were cast flat and swung into position by means of frames or I-beams attached to Richmond Anchors which had been cast into the concrete panels. Richmond anchorages with their established safe load strength and absolute reliability are a natural for all such prefabricated concrete assemblies.

For more information and your copy of Richmond's 1955 Catalogue showing the complete line of Richmond products applicable to all types of concrete construction, write: RICHMOND SCREW ANCHOR COMPANY, INC., 816 Liberty Ave., Brooklyn 8, N. Y. or 315 South 4th St., St. Joseph, Mo.

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wards from this ring, the walls of the outer cone extend. Tapered, they are 11.8 in. thick at the base ring and 23.6 in. thick at the bottom of the tower. The inner cone shell has a wall thickness of 11.8 in. at the bottom of the tower and expands to 17.7 in. where it joins the 18-ft dia bottom plate. The upper plate—where the tower structure joins the cone foundation—is 35.4 ft in dia and 3.3 ft thick. Total thickness of the foundation is 26.9 ft.

The weight of the tower is transmitted to the base ring of the outer cone. Stretched across the diameter of the ring are 112 cables arranged in the manner of bicycle spokes. However, to prevent intersection in the middle of the circle, they are arranged in four layers of 28 cables each. The cables are composed of twelve wires 8 mm in dia.

The maximum vertical load has been estimated at 8,033 tons; tension on the base ring is calculated at 540 tons.

The tower, which was designed by Fritz Leonhardt of Stuttgart, is estimated to cost $160,000. Contractors are the Frankfurt firm of Wayes & Freytag and Gustav Epple of Stuttgart.

Salvador Plans $4 Million Port Structure at Acujutla

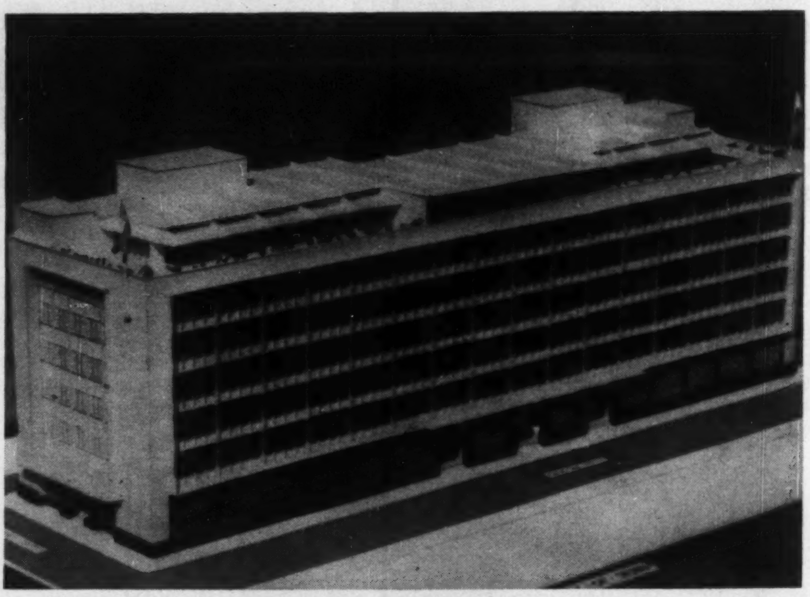
The government of El Salvador has approved the design of a $4 million dock-breakwater to be built at Acujutla on the Sonsonate River 50 mi from the capital.

The structure has been designed by the German firm of Deutsche Bergwerks and Huttenbau Gesellschaft, MBH. Previously the project had been proposed by United Nations engineers at a cost of $16 million. The German company was paid $98,000 for design work.

The dock will be 2,624 ft in length and curved at its outer end. The structure will rest on steel cylinders 39.4 to 46 ft in dia which will be filled with sand. It is estimated that the steel cylinders will withstand the effects of corrosion for about 60 yrs.

The harbor area which will be created will have a depth of 33 ft and will accommodate four 12,000-ton ships in fair weather and two during rough seas. The dock-breakwater will also serve as a desilting device.

Bids will be called for construction within a few months and will be awarded three months later. Construction is expected to take 2½ yrs.



Office Block Planned for Trinidad

Plans for what is believed will be the largest government office building in the British Caribbean have been approved and working drawings are completed. The new office block in Port of Spain has been designed with six working floors and a cafeteria at roof level. It will be over 250 ft long, about 60 ft wide, and 95 ft high. Its six floors will give an area of over 66,000 sq ft. The building will be framed in reinforced concrete with reinforced concrete floors and roof. The scheme is expected to cost about $1½ million.

Form pins are driven swiftly and cheaply with this unbeatable combination—a Schramm Form Pin Driver operated from a SCHRAMM STANDARD PNEUMATRACTOR, driven right to the job. Two pin drivers can be operated simultaneously if desired.

A CONSTRUCTION SUPERINTENDENT REPORTS:

"We drive this complete air compression plant everywhere."

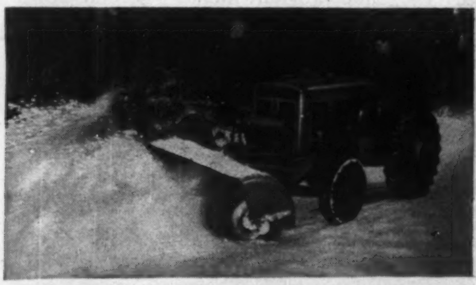
Putting compressed air to work on the job has never been easier or more economical. The operator merely climbs into the seat of his tractor type self-propelled air compressor and drives a *complete* air compressing plant right up to the job. No other equipment or labor is involved.

The outstanding example of this latest trend in portable air compression equipment is the *new* Schramm STANDARD PNEUMATRACTOR — a gasoline engine driven 125 c.f.m. air compressor with tractor features. It's a rugged machine, built to stand the daily abuse of construction or maintenance work. The STANDARD PNEUMATRACTOR can *push, pull, provide mechanical power and compressed air* for operating a variety of auxiliary equipment.

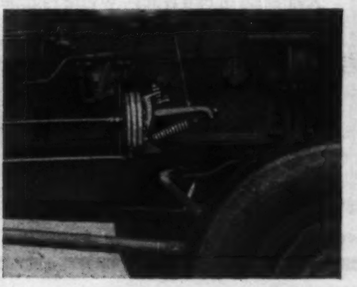
The cost of the STANDARD PNEUMATRACTOR is low; you get the use of a 125 c.f.m. air compressor *plus* a light tractor for less than the cost of many conventional two wheel mounted compressors alone. It's cheaper to operate and maintain, too. Any engine service man can service the PNEUMATRACTOR with very little instruction.

Complete details of this versatile machine are yours for the asking. Request Catalog 5545. Or ask your local Schramm dealer for a demonstration—he's listed in the Yellow Pages of your Telephone Directory.

Pneumajack, mounted on a STANDARD PNEUMATRACTOR, does a variety of jobs from drilling for mud jacking to production drilling.



Equipped with a Rotary Sweeper, the STANDARD PNEUMATRACTOR is ideal for sweeping leaves, dust, snow or light dirt. Hydraulic drive, controlled by operator, makes rotation of brush independent of speed of PNEUMATRACTOR.



The Pneumastat, a Schramm exclusive, automatically controls the speed of the engine and compressor in accordance with air demands, saves up to 50% of fuel costs.

Write for free informative booklet, "Piston vs. Rotary Air Compressors".

Schramm, Inc.
MANUFACTURERS OF AIR COMPRESSORS
620 North Garfield Avenue
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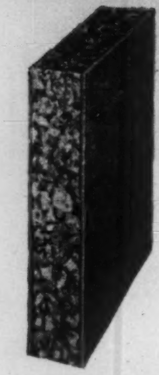
SERVICISED PRODUCTS
for Concrete Paving



The average concrete paving job, whether it be an airport runway, a city street, or a state highway or turnpike, requires the use of four groups of Servicised Products. The first of these is **AIR ENTRAINING AGENT** added to the concrete at the mixer to produce a more durable concrete.

◀ ***Premolded Expansion Joint Fillers***

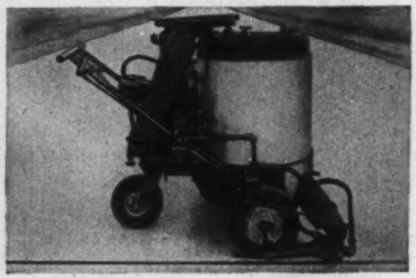
KORK-PAK — an exclusive Servicised development — is the all-purpose concrete paving joint filler. Composed of cork granules bonded together with asphalt between two sheets of heavy asphalt saturated paper. **KORK-PAK** is the *lowest cost non-extruding joint filler on the market*. **KORK-PAK** recovers more than 80% of original thickness after compression, and has a very low rate of moisture absorption. Available in ¼", ⅜", ½", ¾", and 1" thicknesses and standard lengths of 5 or 10 ft. Longer lengths available on special order. The Servicised premolded joint filler line also includes Asphalt, Cork, Self-Expanding Cork, and Sponge Rubber types, as well as Longitudinal Tongue and Groove Joint and premolded Dummy Contraction Joint.

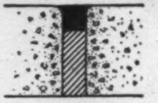
Joint Sealers ▶

Para-Plastic Hot-Poured Joint Sealer is an extremely stable rubberized asphalt compound that forms a resilient, adhesive and effective seal — keeping the joint completely protected under any and all conditions of temperature, moisture and traffic. Para-Plastic is pumped directly into the joint from the melting kettle.

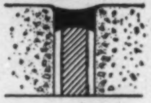
Para-Plastic JF for airport paving has the sealing characteristics of the standard compound, but in addition is impervious to solvents and jet fuel spillage.

SERVITITE Cold-Applied Joint Sealer is a bituminous rubber sealer so compounded that it can be pumped cold from the drum in which it is shipped directly into the joint to be sealed.





Joints compressed in warm weather temperatures



Joints opened in sub-zero temperatures

◀ ***Membrane Curing Compounds***

Available in two types—White Pigmented and Clear. Sprayed or painted on concrete, they form a uniform, moisture-retaining membrane to insure proper curing. Pigmented type reflects heat, reducing temperatures as much as 15°; Clear type, available with fugitive dye to assist in getting uniform coverage is used indoors or where natural color of the concrete must be retained.

Write for the Servicised Catalog today

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6051 WEST 65th STREET • CHICAGO 38, ILLINOIS

Longest Submersible Bridge Under Construction in India

Work has started on what is thought to be the longest submersible bridge in the world—the crossing of the Bombay-Agra highway in Madhya Bharat, North Central India.

The 2,434-ft bridge will have a superstructure of nine reinforced concrete parabolic arches over the deepest portion of the Chambal River and will be flanked by 200-ft long reinforced concrete rigid frame units—three on one side and four on the other. Four spans of 143 ft and five spans of 110 ft have been provided in the arched portion. There will also be semi-barrel and elliptical arches in the spandrel portion between two arches but these will not be visible from the outside as the faces will be covered to prevent logs and other debris from clogging them.

The foundations are of widely differing types since the river bed consists partly of rock in slope and partly of clay overlying rock formations. The piers for the arches will rest on cylindrical concrete shell foundations sunk to rock level up to a maximum of 70 ft; solid concrete cylinders will be used in the perennial stretches of the river.

Over the perennial section the level of the highway is 90 ft above the bed level. Although the average high flood level observed is 24 ft below this, maximum high flood level has reached 27 ft above the road level. The bridge has, therefore, been designed to withstand stresses during submersion under 27 ft of flood water.

Kuwait Moves to Spend $280 Million on Expansion

The tiny principality of Kuwait—with a population of about 150,000—will soon launch a vast economic development program costing about $280,000,000.

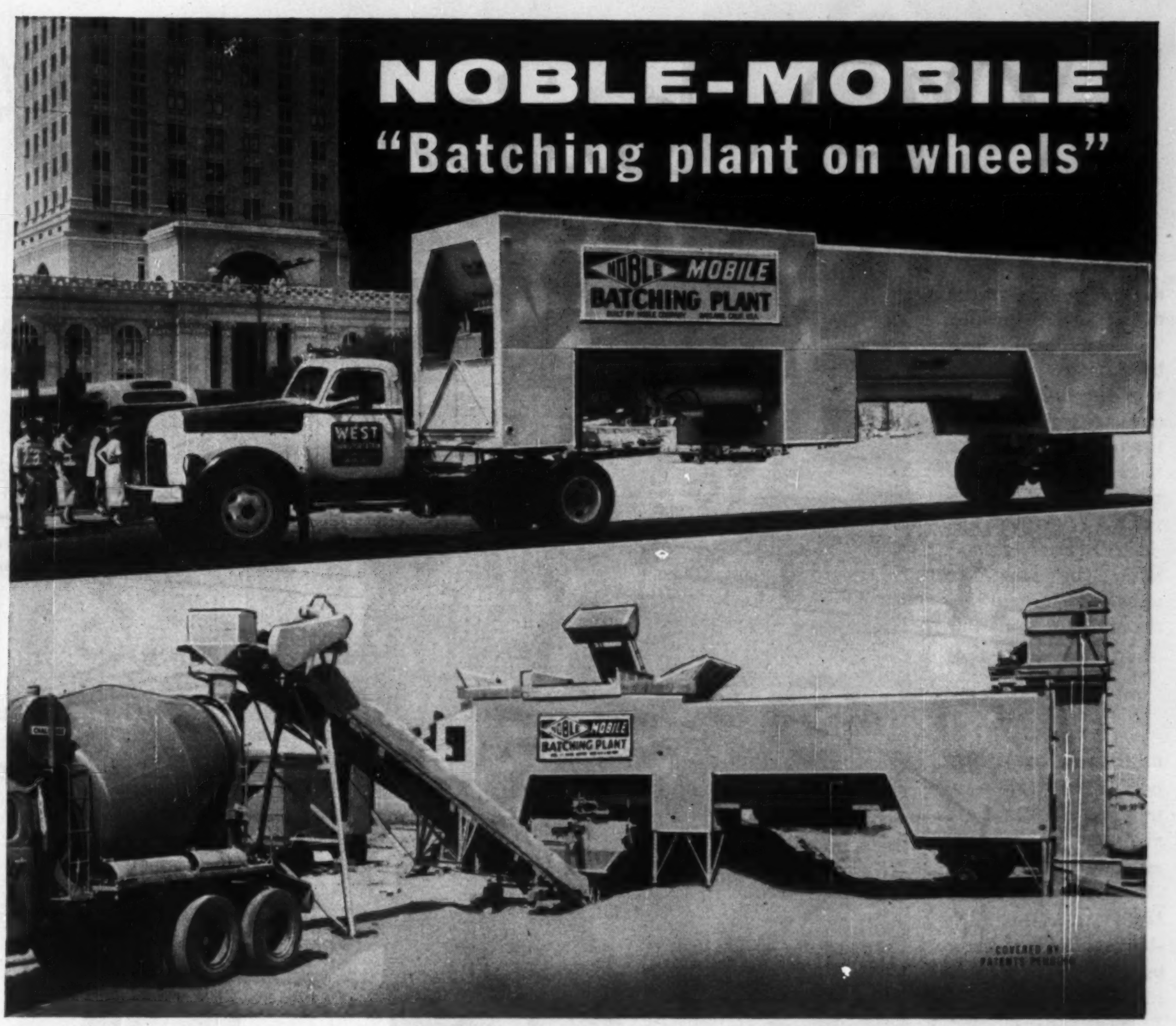
The program includes several plans ranging from irrigation to electrification and also construction of schools, hospitals and highways. All will be financed by revenues which Kuwait receives from petroleum.

Leopoldville's New Airport Has World's Longest Runway

A new airport under construction near Leopoldville, Belgian Congo, will have what is reported to be the world's longest runway. Stretching for 15,420 ft, the new installation will surpass by 1,420 ft the runway at the U. S. airbase in Ben Guerir, Morocco.

NOBLE-MOBILE

"Batching plant on wheels"



the complete plant that saves erection costs... drive it to the job site and start batching!

Noble-Mobile lets you batch at the job site proper where shorter hauls result in greater capacity. You go quickly into production . . . no footings, crane or electrical wiring required.

Noble-Mobile utilizes bulk cement. Aggregates charged with scooploader, conveyor or clamshell. 60 yards per hour or more output to truck mixers. Noble-Mobile drives the highways within legal limits. No special permit required.

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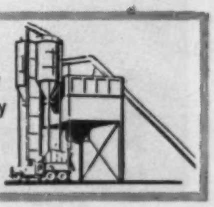
PLANTS

Noble-Mobile

Portable or semi-portable plants



High capacity stationary plants

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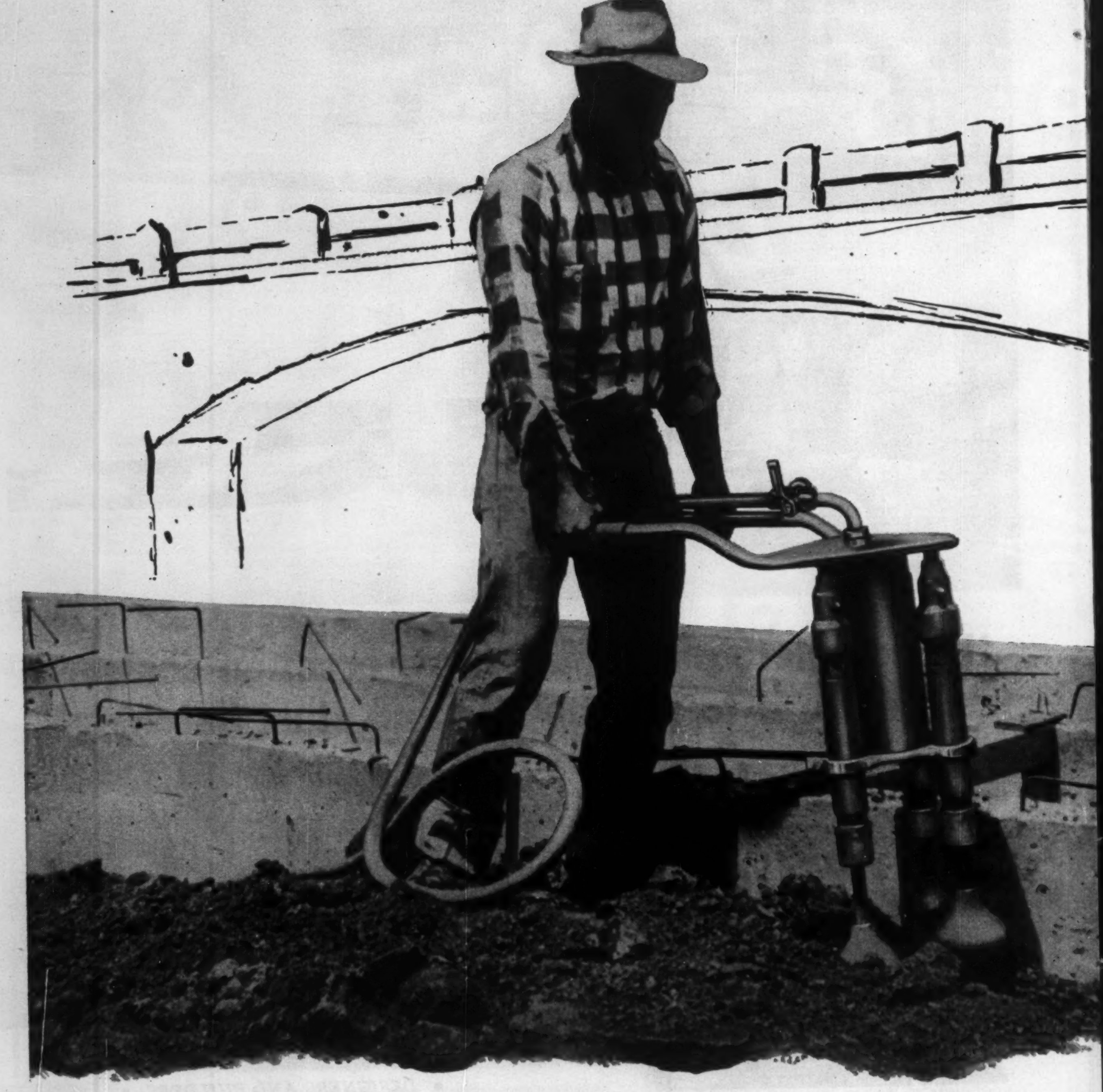
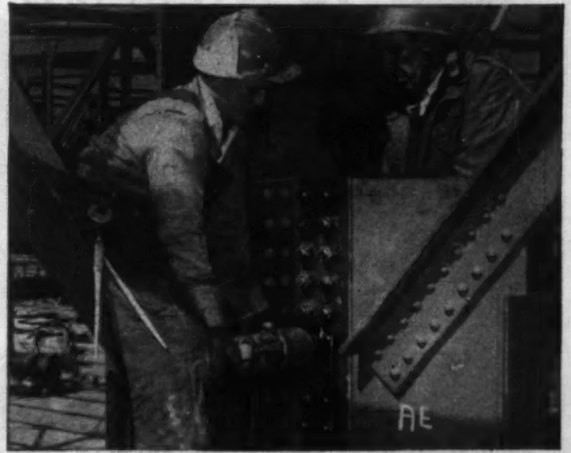
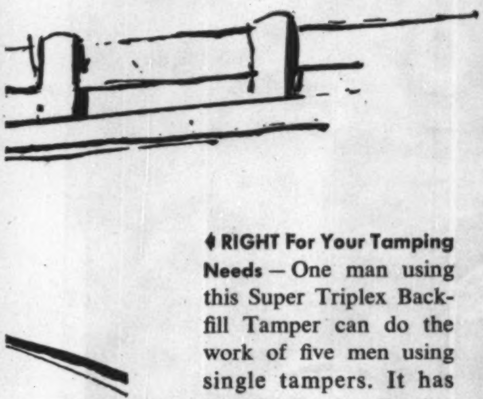
CP equipment is



"Right on the job"

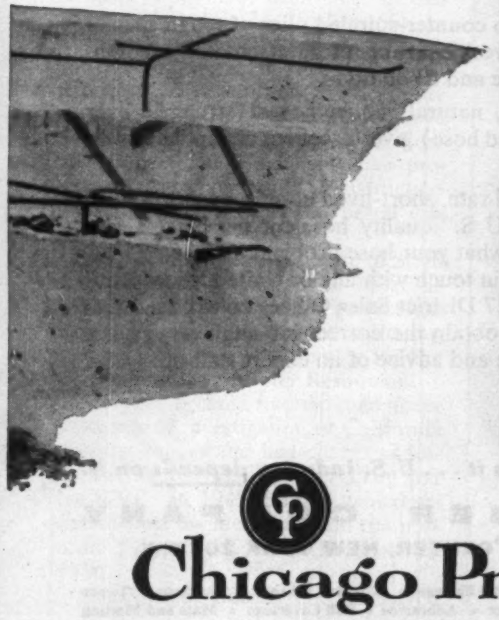


RIGHT For High Strength Bolting — High strength steel bolts afford greater clamping force and stronger joints than ever before possible. And you can make permanent bolted connections or pre-bolt faster, quieter and safer with a CP Air Impact Wrench! Available with side, pistol grip or straight handles and angle head models for hard-to-reach spots.



◆ RIGHT For Your Tamping Needs — One man using this Super Triplex Backfill Tamper can do the work of five men using single tampers. It has wheelbarrow handles that make it easy to guide over the work — gets more uniform compaction. The Triplex affords more efficient distribution of manpower...saves on air hose and air consumption.

RIGHT for Demolition Work — CP Demolition Tools afford maximum penetration yet their easy handling qualities and responsive throttling action are ideal where footing is hazardous. Capacities range from the CP-111 (25 lb. class) to the CP-117 (80 lb. class).



RIGHT For Dependable Air Supply — CP "Power Vane" Rotary Compressors afford thousands of hours of trouble-free service with minimum attention. CP Rotaries are available in capacities of 125, 210, 365, 600 and 900 cfm.

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IT'S PLACES LIKE THIS THAT PROVE HOW RUGGED is U.S. Royal Cord Air Hose
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It's built like a tire!

That's right! U. S. Royal Cord is built like a tire . . . *it has to be,* to take the battering it gets on all kinds of jobs, under extreme pressures. U. S. Royal Cord is hit by rocks in blasting; heavy tools fall on it; trucks and other vehicles roll over it; workmen pull it over jagged rocks. But U. S. Royal's unique cord construction, borrowed from "U. S." tiremakers, lets U. S. Royal come through unharmed. Needs no cribbing. Despite its great strength, this hose is very light and flexible.

- Tube of high quality neoprene for maximum oil resistance.
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- *Exclusive:* Two counter-spiraled plies of tough special yarn floated in resilient rubber for outstanding strength, shear resistance and flexibility.
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Buying second-rate, short-lived hose is no short-cut to economy. Get "U. S." quality hose for the biggest savings. No matter what your hose problem may be, "U. S." can solve it. Get in touch with any of United States Rubber Company's 27 District Sales Offices or write address below. You will obtain the correct job-engineered hose, and the guidance and advice of an expert staff of "U. S." engineers.

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MEN AND JOBS

A. D. Edmonston

Two West Coast Engineers Retiring From State Posts

A. D. Edmonston, California State Engineer for the last five years, plans to retire on Nov. 1. He has been in state service for 31 years and looks forward to private practice as a consulting engineer.

Recognized as a leading authority on California water problems, he has attracted considerable attention in recent years because of his recommendations that the state build the $1.5-billion Feather River Project and take over the federally built Central Valley Project. Both have been controversial issues (ENR, July 24, 1952, p. 66).

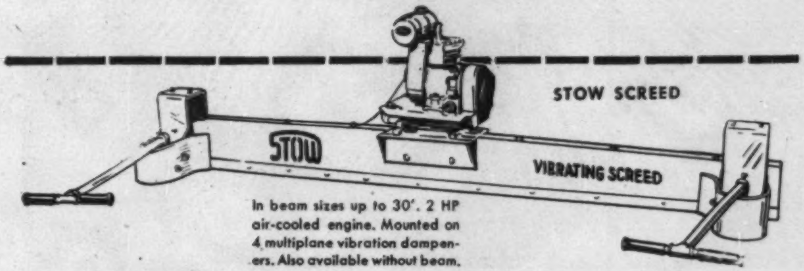
Gerald H. Jones, assistant state engineer, will retire at the same time. He has had supervision of the safety of dams, operation and maintenance of the Sacramento River Flood Control Project, flood damage repair programs, state hydraulic construction projects, snow surveys and beach erosion control.

A civil engineering graduate of Stanford University, Edmonston served as engineer on various water projects in California until he entered state service in 1924 as cost estimator for the State Division of Water Resources.

He later became hydraulic engineer in charge of investigation of California water resources and had charge of formation of the State Water Plan and the CVP. In 1945, he was named assistant state engineer and held the post until Edward Hyatt's retirement in 1950.

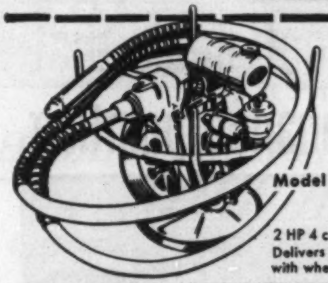
In addition, Edmonston has served

Concrete facts about Concrete Vibrators and Screeds



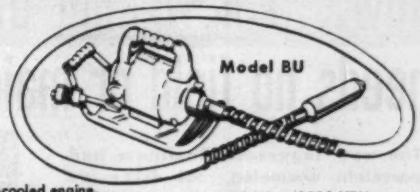
STOW SCREED

In beam sizes up to 30'. 2 HP air-cooled engine. Mounted on 4 multiplane vibration dampeners. Also available without beam.



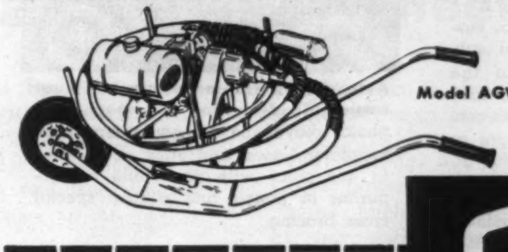
Model BG

2 HP 4 cycle air-cooled engine. Delivers 6000 to 9300 Available with wheelbarrow mount.



Model BU

2 HP at 9000 VPM
115 V. AC or DC



Model AGW

4½ HP 4 cycle air-cooled engine. Mounted on wheelbarrow for easy maneuverability. Delivers 6000-9300. Available without wheelbarrow.

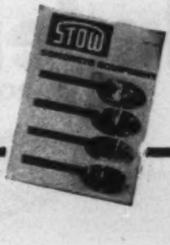
STOW

Here is the name you want!

The high operating speeds of the new STOW line of Concrete Vibrators make possible the use of heavy duty, light weight flexible shafting and lighter, more efficient vibrator heads—which speed operations, cut costs. And, STOW design provides convenient, practical speed control so *attachments may be used directly on the vibrator shafts.*

STOW SCREEDS—permit placing more than 300 cu. yds. in less than 8 hours; strike off and impact in one operation; leave surfaces true to grade; work up to and around manhole covers and obstructions.

See your STOW distributor about STOW vibrators and screeds today. Send for free Catalog 552.



STOW MANUFACTURING COMPANY
19 Shear Street Binghamton, New York

WHAT'S NEW in roof deck?

now...a new kind of roof deck that needs no field or maintenance painting

The new Ingersoll aluminum and porcelain enameled roof decks are designed to give a more attractive, more efficient industrial ceiling at substantially lower costs in time and money.

A system of full-floating panels, simply clips on to galvanized steel subpurlins which are welded to the building purlins. This means fast, easy erection and permits expansion and contraction without the usual pressure or strain.

Field and maintenance painting are unnecessary with either the aluminum or the porcelain enameled decking. Both give a highly attractive ceiling that lasts for years, contributes to lighting efficiency. Aluminum deck has thermal insulation value.

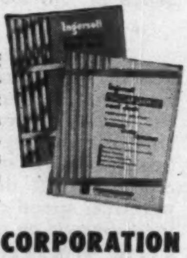
The highly corrosive-resistant porcelain enameled steel decking is double coated with chemically inert porcelain enamel. It is designed for use where moisture, acids, etc., damage ordinary decks. Also excellent in dairies and other places where its gleaming look is desirable.

Accessories accommodated without cutting load-bearing members. The photo above shows how sump pans, ventilator bases, and other accessories fit into place with no cutting of subpurlins or panels and without special cross bracing.

Exceptional strength of these decks is shown in Pittsburgh Testing Laboratory reports. They will be promptly submitted on request.

Investigate now!

New Ingersoll Roof Deck may be exactly what your next job calls for. Learn the whole story now. Illustrated booklets are available to give you all the details.



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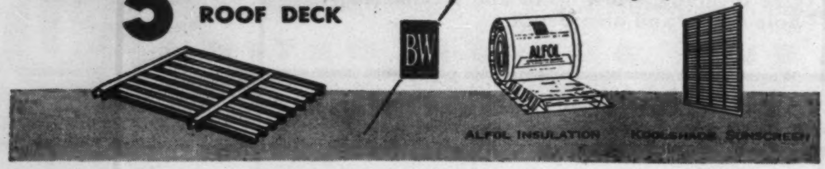


as head of the California Division of Water Resources, secretary of the Water Resources Board, executive officer of the California Water Project Authority and member of the Water Pollution Control Board.

Assistant state engineer Jones has been in state service for 31 years. His earlier posts were with the East Bay Water Co. on construction of San Pablo Dam and tunnels, with the city of Napa on its Milliken Canyon Dam project, and with the East Contra Costa Irrigation District as chief engineer. He has also worked on miscellaneous irrigation, water works and power developments, including the Salmon Creek Dam in Alaska.

To Play a Leading Role At Road Meeting in Rome

James A. Anderson, Virginia commissioner of highways, will serve as one of the three discussion leaders at the Second World meeting of the International Road Federation, to be held in Rome, Italy, next month. Other rapporteurs are from London and Paris.

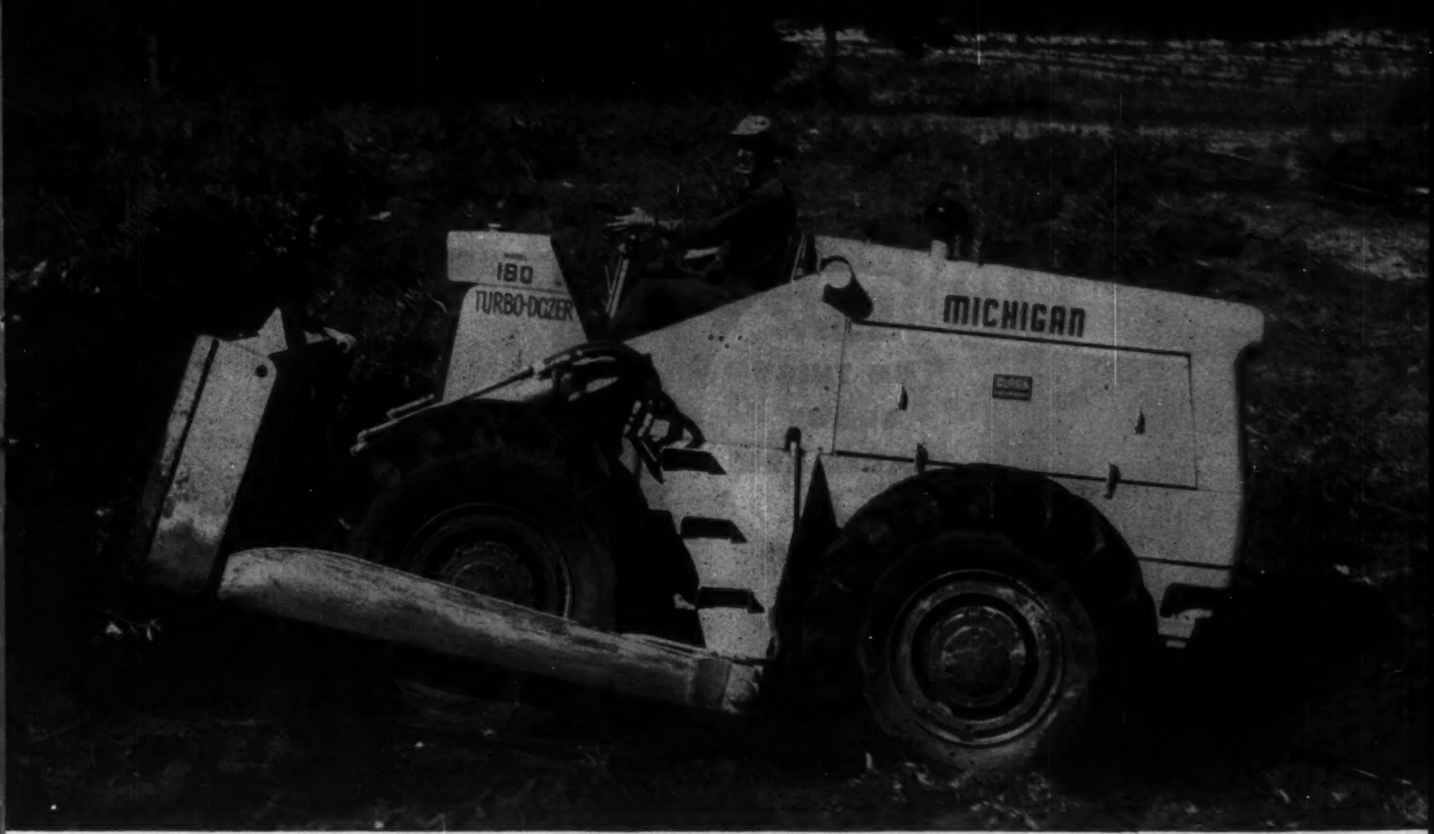
Appointed Virginia highway commissioner in 1941, Anderson served as president of the American Association of State Highway Officials in 1951 and three years later was awarded the Bartlett Award for individual contribution to highway progress.

At the forthcoming meeting of the federation, he will direct discussion and reports on technical training, including that of highway engineers, traffic engineers, and road equipment operators and mechanics.

Although Anderson was state engineer and director of the Federal Public Works Administration in Virginia from 1933 to 1936, he devoted most of his early career to teaching. At the time of his appointment to the highway post, he was dean of the faculty at Virgina Military Institute, with the rank of brigadier general in the state guard, having previously served as head of the civil engineering department.

The International Road Federation was established seven years ago as a non-profit, non-political agency to encourage the development and improvement of highways and highway transportation throughout the world. With offices in Washington, London and Paris, it has member national organizations in 56 countries.

Before returning to the United States Anderson will make an inspection tour of the highways in Italy, France, Germany and the United Kingdom.



Report on the MICHIGAN TURBO-DOZER:

New dozer features 27 mph speed, power-tilting bowl, rear-wheel steer

The new 2¾ yd. capacity Michigan Turbo-Dozer combines rubber-tired speed and mobility with outstanding traction and power. Its turbocharged diesel engine develops 165 hp, with maximum rimpull of 28,000 lbs.—plenty of power for heavy dozing, push-loading and land clearing. At 27 mph, it runs rings around any dozer on the market!

Power-tilting bowl. A powerful double-acting hydraulic cylinder tilts the bowl back and forth through a 33 degree arc. You can change the angle of the bowl from "dig" to "float" as you travel—work the cutting edge back and forth under stumps and boulders to uproot them. Two 6-inch lift cylinders give you tremendous lifting power and down-pressure—you can raise the cutting edge from 24¼ inches below ground level to 43¾ inches above.

High flotation tires, oscillating axle. Big 18.00-25 low pressure tires (nearly 7-foot tread) give the Turbo-Dozer excellent ground contact in dry, wet or sandy footing. You can cross railroad tracks or travel along the ties or road bed; you can climb curbs and drive safely on any kind of road surface. On uneven terrain, the steering-drive axle oscillates to keep both rear wheels in firm contact with the ground. With 14½ inches of ground clearance underneath, it's practically impossible to get "hung up"

Full traction while turning. The Turbo-Dozer gives you full tractive effort even in a turn. *All four wheels are always driving*, except when you declutch the rear axle for highway travel. Rear-wheel steering eliminates unnecessary tire wear—you don't brake or drag your inside wheels on a turn. If one wheel begins to slip, a locking differential automatically applies power to the wheel with the firmest footing.

Power-shifting, 300% torque multiplication. Clark's exclusive power-shift transmission eliminates the conventional engine clutch and foot pedal—the most notorious cause of excessive maintenance and operator fatigue. With two finger-tip levers on the steering column, the operator can instantly shift between High-Low and Forward-Reverse—even when moving in either direction.

The 3-to-1 Clark torque converter gives you a steady power flow, regardless of speed. As the load gets heavier the torque output automatically increases up to 300% at stall speed—gives you the extra torque to plow through the toughest spots. You can't stall the engine, and there's no clutch to slip.

Prove it for yourself. The new Michigan Turbo-Dozer gives you faster cycles and more yardage in every shift—more dollars of profit every day. Ask your local Michigan distributor to prove it, with an on-the-job demonstration; or write direct for detailed specifications. The Turbo-Dozer is available on the low-cost Michigan Lease Plan: no down payment, pay as it produces!

MICHIGAN is a trade-mark of Clark Equipment Co.

CLARK EQUIPMENT

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THIS distinctive PLYSCORD stamp on the panel identifies genuine DFPA fir plywood sheathing—quality-tested by DFPA to protect the buyer and assure performance. Write for new PLYSCORD calculator—handy slide rule giving recommended nailing procedures, thicknesses, etc. FREE from Douglas Fir Plywood Association, Tacoma 2, Wash.

EXT-DFPA PLYSHIELD PLYPANEL PLYSCORD PLYBASE PLYFORM

INSIST on DFPA grademarked fir plywood! EXT-DFPA and PLYSHIELD for outdoor use . . . PLYPANEL for paneling, built-ins . . . PLYSCORD for sheathing . . . PLYBASE for underlayment . . . PLYFORM for concrete form work. Other grades for other uses

MEN AND JOBS

Public Health Officers On Foreign Assignments

Several members of the commissioned engineer reserve of the U. S. Public Health Service have been called to active duty and assigned to Central and South America as participants in the International Cooperation Administration Program. Among them are:

- Robert Brewer, district sanitary engineer with the California State Health Department in San Bernadino, who has gone to Surinam, South America, to become principal sanitary engineering advisor to the Director of Health, as a member of the U. S. Operations Mission to Surinam. He will be a consultant in the field of general sanitary engineering and environmental sanitation, and will also develop and supervise training courses for native sanitary engineers.
- Linvil G. Rich, professor of sanitary engineering at Virginia Polytechnic Institute, who has reported to La Pas, Bolivia. His job is to organize and conduct a training course for Bolivian sanitary inspectors who will be assigned to health centers and other projects throughout the country. Consultation with health officers on improvements in sanitary inspection techniques is also one of his functions.
- Scott W. Brandon, formerly with the U. S. Operations Mission to Iran, who is now in El Salvador, Central America, as chief sanitary engineer with the Operations Mission to that country. His new duties are primarily related to the planning and supervision of new sanitary engineering projects. Before going to Iran in 1951, Brandon was an assistant engineer with the Corps of Engineers in the Panama Canal Zone.

Illinois Central Engineer Retires After Long Career

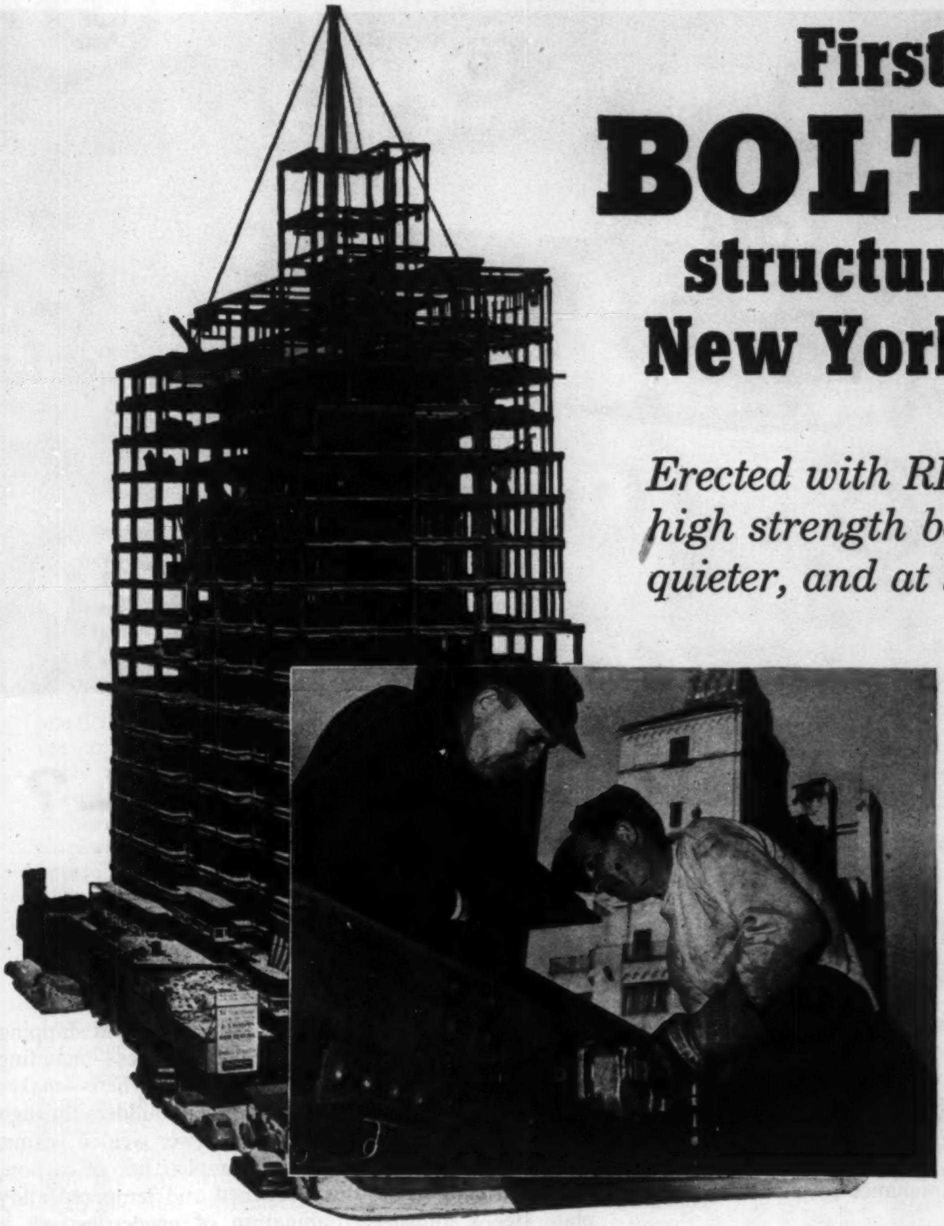
John E. Fanning, assistant to the chief engineer of the Illinois Central Railroad, has retired after fifty years of service with the company.

In the wake of his retirement, Mark Block, engineer of bridges, has been promoted to assistant to the chief engineer; Elmer A. Johnson has become engineer of bridges; and Alphus L. Leach has taken over as assistant bridge engineer.

Fanning's career with the company began as an instrument man in Gulfport, Miss., following his graduation from the University of Mississippi. He held various engineering positions, including those of district and division engineer, and was named assistant to the chief engineer in 1942.

First BOLTED structure in New York City

Erected with RB&W high strength bolts faster, quieter, and at less cost



35 Park Avenue; Architects, Sylvan Bien — Robert L. Bien; Structural Steel Fabricated and Erected by Grand Iron Works, Inc.; Builder and Owner, Anthony Campagna and Sons.

Two-man bolt team completes more joints per day than the usual four-man rivet crews . . . eliminates hazards of handling hot rivets.

IN NEW YORK, too, the many advantages of construction with bolted steelwork are now being realized. First such structure is this new 18-story apartment building in New York's exclusive Murray Hill district. Field joints are all made with RB&W high strength bolts . . . faster than by riveting, with no ear splitting clatter, and with a big saving in work and costs.

Quickly and uniformly tightened to proper load with impact wrench, RB&W high tensile bolts clamp steel members together with a terrific grip. They develop optimum shear and tension in each joint . . . stay tight under vibration and dynamic loading.

RB&W is the largest independent supplier of high strength bolts for construction. Used from coast to coast, RB&W bolts are noted for their quality, uniformity, ease of assembling and complete dependability for bridges, buildings, and equipment.

Get full data on how bolting gives you a *better* structure at a *saving.* See Sweets Architectural or Industrial Construction File (2cR/V) or write to Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

RB&W

110th year

Plants at: Port Chester N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee, New Orleans, Denver, Seattle. **Distributors** from coast to coast.

Looking for a TOUGHER STEEL?

Unusually tough, even at sub-zero temperatures, Lukens "T-1" steel can reduce equipment costs.

Failure from abrasion or from impact can happen to the steel in your equipment, too. Here's the answer—the tougher steel you've been looking for. Lukens "T-1" steel has excellent resistance to the combination of wear and impact, is tough enough to withstand unusual stresses and pressures as well as shock at either sub-zero or high temperatures, thus lowering maintenance costs and lengthening equipment life.

Equipment builders will find that the techniques of working with this new steel are no different than with carbon steel. Lukens "T-1" steel can be fabricated not only in the shop but also in the field, through proper design procedures. Because of its high yield strength (over 90,000 psi) this new steel offers lighter weight and reduced thickness in comparison to heavier, thicker plates of carbon steel, thereby reducing material, fabrication and shipping costs. And Lukens' range of steel plate sizes—including the widest and heaviest plates available anywhere—makes possible additional savings for equipment builders through the use of wider plates that require fewer welded seams.

The latest addition to Lukens' complete line of carbon, alloy and clad steels, this quenched and tempered alloy plate steel's unusual combination of properties suit it especially to application in pressure vessels, bridges, shipbuilding, construction machinery and general industrial equipment. On problems of design, selection, application and fabricating techniques, Lukens offers full technical assistance. If you would like further information on Lukens "T-1" steel, write for the new 28-page Bulletin 781. Address: Manager, Marketing Service, 774 Lukens Building, Lukens Steel Company, Coatesville, Pa.

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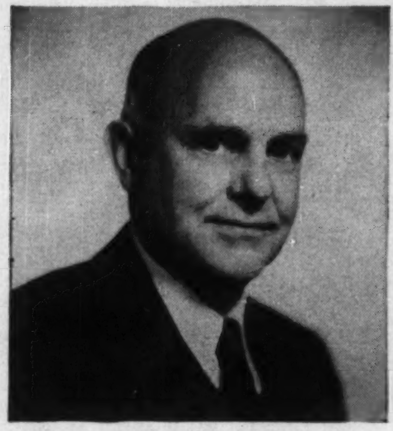
THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS

LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA



R. G. Wadsworth

R. G. Wadsworth Retires From San Francisco Post

Ralph G. Wadsworth has retired as city engineer for San Francisco and plans to return to the engineering practice which he left when he took the city post ten years ago.

His successor is Reubin H. Owens, a civil engineering graduate of the University of Dublin, who has been chief designer for the city engineering bureau for the last eleven years.

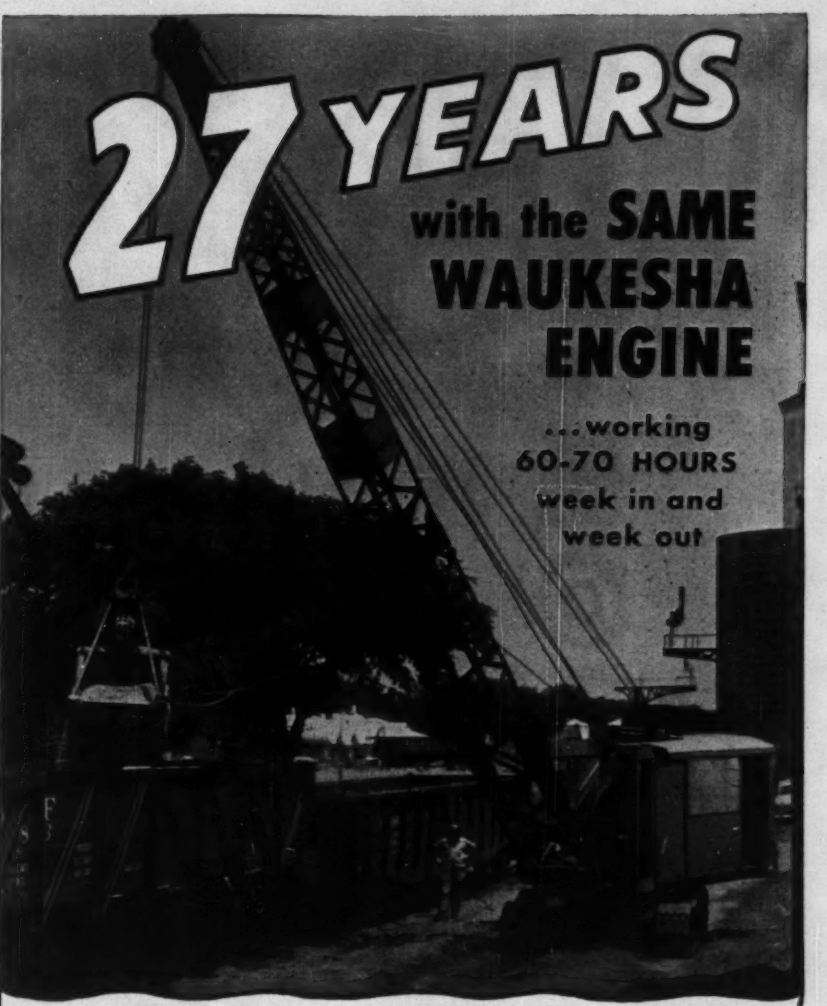
During his service with the city, Wadsworth supervised the planning and construction of more than $70 million worth of projects. Among them were the $6-million Broadway Tunnel, two sewage plants and an extensive city street program.

Wadsworth's engineering career began in San Francisco, where he worked for Fred H. Tibbetts after obtaining his civil engineering degree from the University of California. He established his own practice in 1931.

During the late 1930's, Wadsworth supervised construction projects undertaken by state and federal relief organizations in California, and later served for one year as state director of the U. S. Employment Service. He is presently a member of the San Francisco Regional Water Pollution Control Board, an advisor to the University of California's Institute of Traffic and Transportation Engineering, and engineer for Joint Highway District No. 10—a post he will retain.

Highway Engineer Joins National Lime Association

Conrad M. Kelley, who recently headed up the Dallas District laboratory of the Texas Highway Department, has joined the National Lime Association. With headquarters temporarily in Garland, Texas, he will provide technical information and



Unloading 32 railway cars of sand in 9 hours! That takes a fast operator, a good crane, and speedy, responsive, reliable power.

Contractors L. V. Hites and M. W. Martin of Topeka, Kansas, have such a combination.

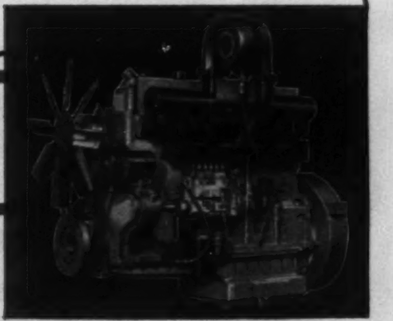
Operator, Earl Walker, has been speeding up construction jobs with this Waukesha Engine powered American Crane ever since 1928.

That's 27 years' straight—working 60 to 70 hours every week. The Waukesha JL (Serial G-181) is the crane's original engine. It's had several overhauls, of course. Once it got a set of second-hand blocks (when new ones couldn't be had). Sure they offer Earl new cranes. He likes this crane and its Waukesha.

...and modern Waukesha Engines have even greater stamina and reliability

GAS • GASOLINE • NORMAL or TURBOCHARGED DIESELS
—up to 1135 horsepower for every industrial service

Modern 1197 cu. in. Waukesha Turbocharged Diesel—Model WAKDBS—over 350 hp—used in many makes of cranes, shovels and heavy trucks. Send for bulletin.



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Air-operated controls — and a crane that is always ready to go to work. Torque-Controls for smooth, accurate handling . . . and almost no clutch wear or adjustment. Short wheel base and only *six tires* so that it can turn and travel in any aisle big enough *for a truck.*

All ORTON cranes now have *Torque-Control*

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ORTON

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service to highway engineers on lime stabilization of road bases and subbases.

With his appointment, the association becomes actively engaged for the first time in highway use of lime on a nation-wide basis.

Kelley has been with the Texas Highway Department for over 16 years and has supervised laboratory testing of lime-soil mixtures since 1953. He has also been associated with highway engineering consulting firms, and has spent six years as a highway engineer with the Army, where he supervised construction and reconstruction of lime stabilized roads in military bases and camps.

Aids Mission In Korea

Charles F. Davis, Jr., member of the architectural firm of Van Keuren, Davis & Co., Birmingham, Ala., has gone to Taejon, Korea, to assist in the planning of a mission college sponsored by the Presbyterian Church.

He volunteered his services after an urgent request from Taejon for an experienced U. S. architects.

Davis, whose firm has designed a number of churches in the Birmingham area, expects to be in Korea for several weeks on the liberal arts college assignment.

P. P. Kirby

Appointed Chief Engineer

Albert Kahn Associated Architects and Engineers, Inc., Detroit, Mich., has appointed P. P. Kirby as chief engineer of its Structural and Civil Engineering Division.

Kirby joined the firm in 1933 and has been a member since 1947.

There's a Terra Cobra to match every job requirement: The big 18-yard 10-speed TH-0142 and the versatile 15-yard TH-0908.

BONUS LOADS in *all* types of material give Terra Cobras the edge when it comes to profits

It took just 38 seconds for the Terra Cobra pictured above to get a heaping load, working in hardpan shale. Because of the exclusive combination of Wooldridge design features, Terra Cobras get bonus loads whether you're working in sand or gumbo or just plain dirt—with ease and speed like nothing else in their class. And they dump faster, easier, cleaner, even in sticky clay. Today, when every fraction of a cent per yard makes the difference between profit and loss, Terra Cobras have other important advantages that can't be overlooked. There's balanced power and speed for all haul and load conditions—exclusive air-actuated winch that's "live" for full scraper control *all the time,* located up out of the dirt where it belongs—and especially the Cobra's ruggedness and accessibility that have never been equalled for cutting service and maintenance time to the minimum.

Because your profits are at stake, it will pay you to get together with your Wooldridge dealer to find out why Cobras can give you *bonus loads* and performance to give you an edge in competitive bidding—and profits.

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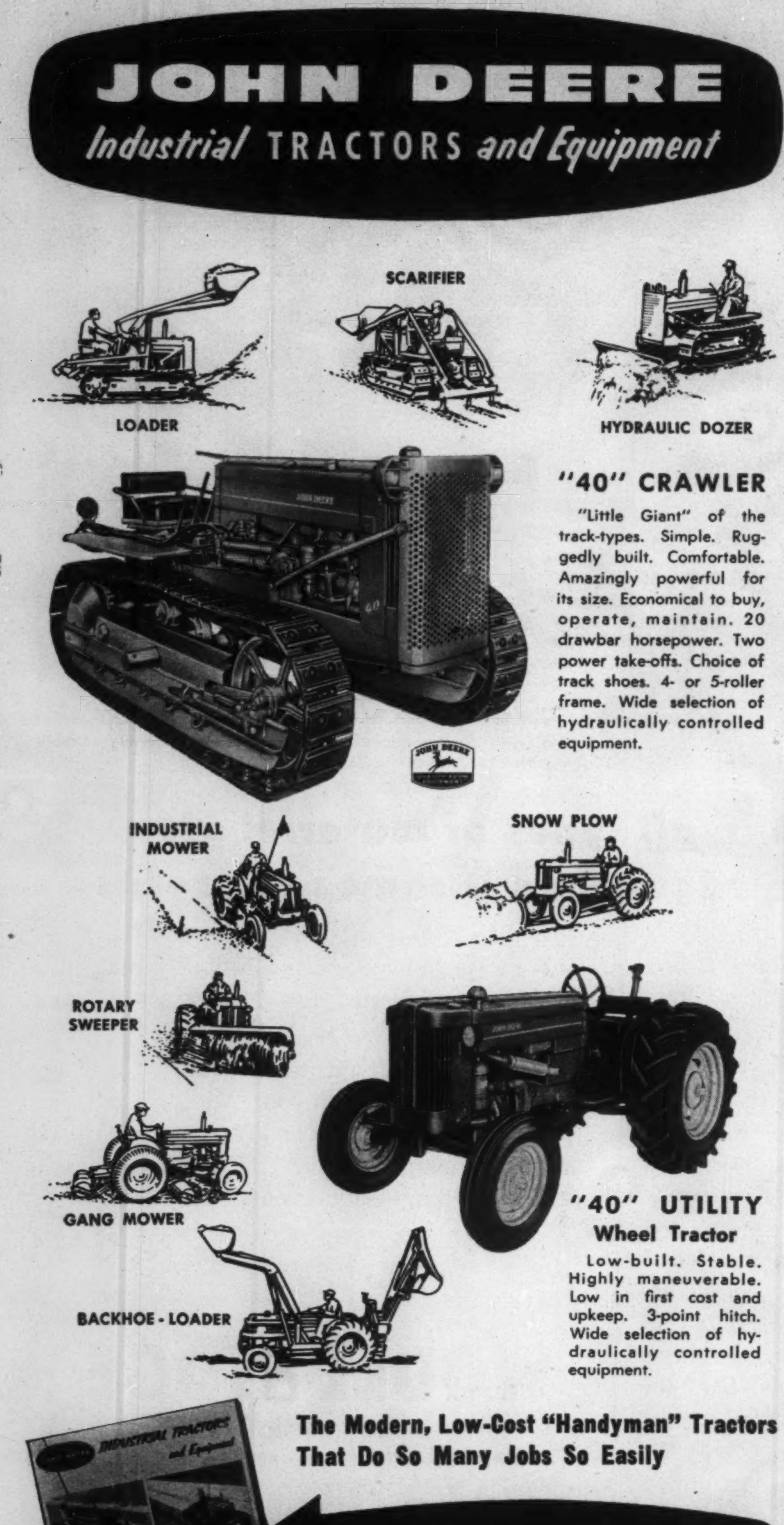

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MEN AND JOBS

Men and Jobs Briefs . . .

• **Corps of Engineers – Sam W. Hunter,** specialist in soil mechanics and foundation engineering in the Wilmington, N. C., district office of the Corps, resigns to become professor of civil engineering at the University of South Carolina, where he will teach soil mechanics.

• **Associations–John T. W. Babcock** is appointed permanent secretary of the Metal Roof Deck Technical Institute, an association of producers aimed at improvement of roof deck construction. He succeeds **E. A. Miller,** manager of the Building Panel Division of Detroit Steel Products Co., who has filled the job for seven years on a part-time basis.

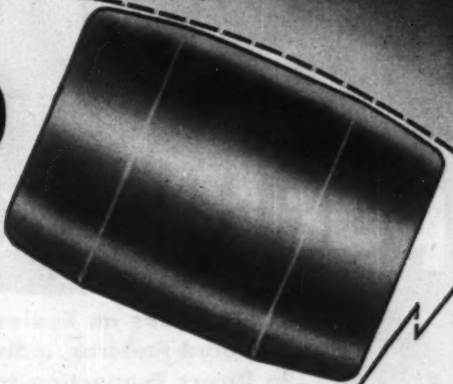
• **Careers–Paul C. Northrop** is named acting roadmaster for Multnomah County, Ore., succeeding the late **George W. Buck** who had held the post since 1925 . . . **Odell Strickland** takes over as superintendent of the city water department at Selma, N. C., replacing **Charles Reaves,** who recently resigned.

• **Business**–Ammann & Whitney, New York, N. Y., consulting engineers, appoint **Albert L. Best** an associate . . . **Angus J. O'Brien** is named to the newly-created post of vice president and director of engineering and manufacturing, Gar Wood Industries, Inc., Wayne, Mich. . . . **Frank B. Warren** joins The Kuljian Corporation, Philadelphia engineers and constructors, and is named general office manager.

• **Honors**–Next month, the Franklin Institute will award a Frank P. Brown Medal to **Charles S. Leopold,** Philadelphia consulting engineer, for his contribution to air conditioning, particularly in the research and development of air conditioning techniques and the application of air conditioning to several important structures.

• **Education**–The University of Michigan receives a $10,000 gift from **David B. Steinman,** bridge designer and chief engineer of the Mackinac Bridge, for use as a scholarship fund in the School of Engineering . . . Four top students from state forestry schools in Michigan, Minnesota, Montana and Oregon complete a ten-week course in wood technology and utilization at the Washington, D. C., laboratory of Timber Engineering Co. –this is the sixth year of the scholarship program.

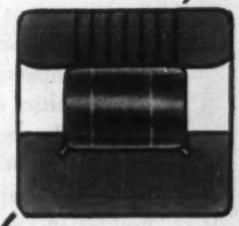
NOW... all Tru-Rol Bearings *have* CROWNED ROLLERS



● When a straight cylindrical roller bearing is under load, the highest stresses tend to concentrate at the roller ends. Stresses may become excessive and cause early bearing failure.

Crowning is a Rollway grinding refinement that adds a long radius curve to the roller ends. This relieves the high stress areas — allows the rollers to take heavier loads and reduces the effect of slight shaft misalignment or deflection. Bearings can be load rated at substantially higher values — provide a longer service life.

Crowning is but one of the many engineering advances built into Rollway Tru-Rol Bearings. Write for the complete story. Rollway Bearing Co., Inc., 567 Seymour St., Syracuse, N. Y.



Crowned roller under full load — stress uniformly distributed.

Carefully selected crown radius, varying from 70" to 260", provides proper relief for normal loading to which bearing will be subjected.

Crowned Tru-Rol Bearings available in the following type:

Full Roller

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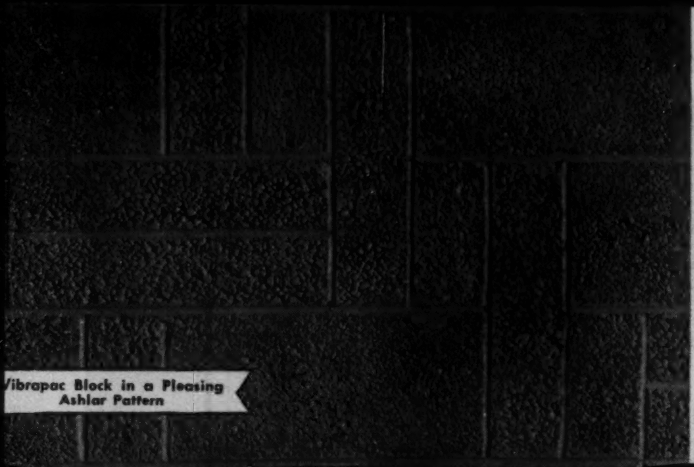
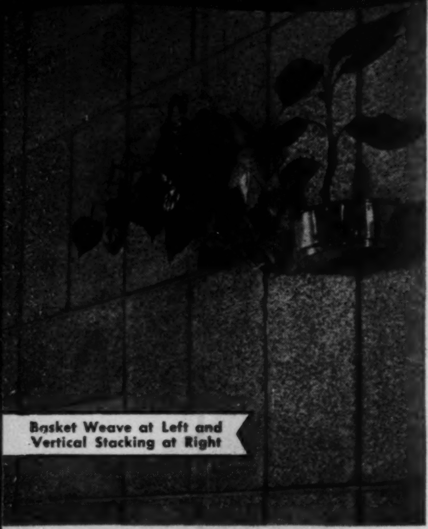

Vibrapac Block in a Pleasing Ashlar Pattern

Alternate Rows of Full Height and Half Height Units

Vibrapac Block is Versatile!


Basket Weave at Left and Vertical Stacking at Right

. . . Provides an Endless Variety of Textured Patterns . . . Sizes Available in Direct Proportion to Wall Areas

You get beauty at its permanent best when homes and other buildings are built of Vibrapac Block. This modern, low-cost building material provides almost unlimited opportunities for creative architecture and structural versatility. Numerous styles and sizes, interesting textures and distinctive color tones challenge both architect and builder in their efforts to achieve beauty and permanence. Ask your nearby Vibrapac Block plant for literature, or write direct:

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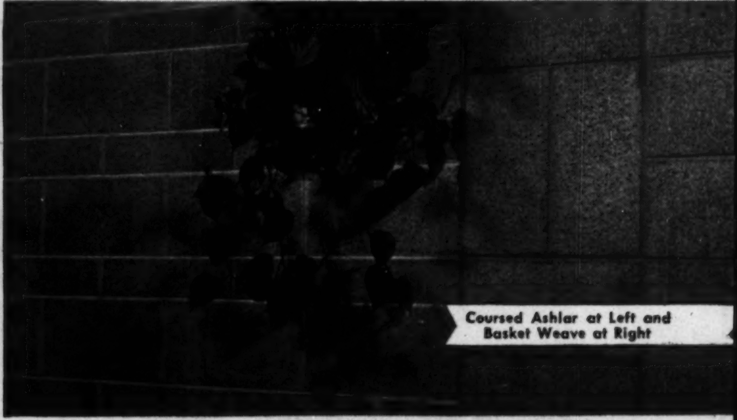
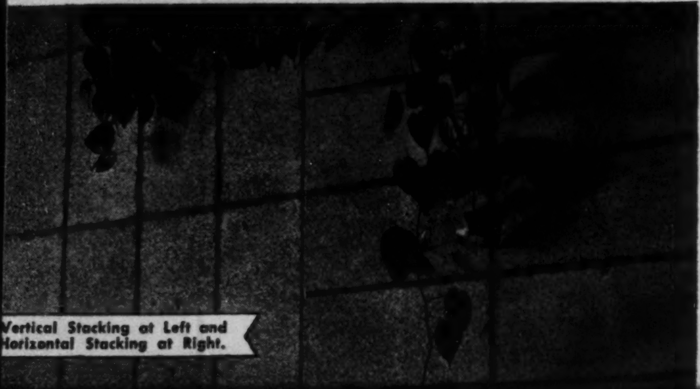
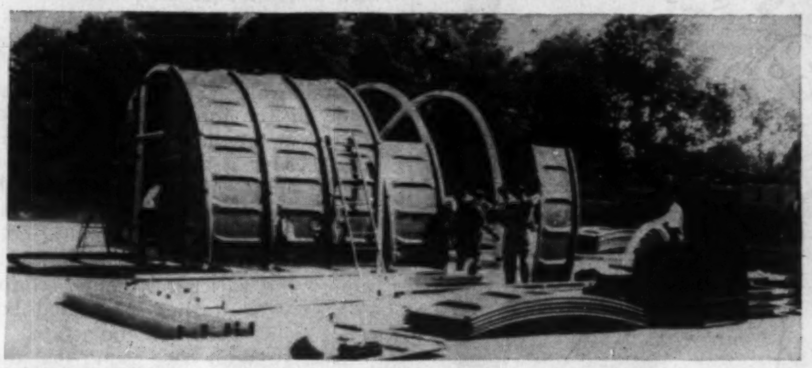
Half Block Stacked. Even the Clock is Made of Vibrapac Block

Vibrapac Block in Running Bond with Control Joint.


Coursed Ashlar at Left and Basket Weave at Right


Vertical Stacking at Left and Horizontal Stacking at Right.

Another Interesting Example of Modern Ashlar Pattern



STOCKPILED COMPONENTS are rapidly put up to form one of two structures comprising Air Force's new radar shelter. Fully-equipped shelter is erected in less than 3 hours by 14-man crew.

Plastic Radar Shelter Erected in 3 Hours

A lightweight plastic and aluminum shelter that can be erected in less than 3 hours has been developed for the Air Force by Luria-Cournand, Inc., Havre de Grace, Md. Two arch-shaped structures, 32x24 ft and 18x24 ft, and their radar equipment comprise the portable shelter which can be erected by a 14-man crew equipped with only ladders and wrenches. The structures are designed to withstand winds up to 90 mph.

Framing consists of aluminum arches spaced about 4 ft apart Each arch is made up of four interchangeable sections, which are joined in the field by quick-fastening pins. Glass-fiber panels, 7 ft x 3½ ft, form a shell that is bolted on the aluminum skeleton.

Floors are aluminum-faced honeycomb sandwich panels. They are laid on beams, which, in turn, rest on jacks. The jacks make it possible to level the structure after it is erected.

A typical panel has an olive-drab exterior cover, an insulation blanket and an interior liner—all of glass-fiber, with a rubber vapor barrier between the insulation blanket and the interior liner.

The shelter was developed to enable radar teams to set up an emergency warning system in a few hours and be able to dismantle and move on quickly. The fully equipped shelter can be transported by three trucks.

Protection From Radioactive Fall-Out

An inexpensive wood-fiber building board said to filter radioactive fall-out, disease-laden particles and poison gases has been developed by the U. S. Forest Products Laboratory under contract with the Army Chemical Corps.

Called "diffusion board," the new material is presently undergoing extensive testing by the Laboratory and Army Chemical Center in Maryland for use in shelters.

The diffusion board looks like ordinary building fiberboard. Chemicals in it screen out the deadly gases and particles, at the same time permitting life-sustaining oxygen and carbon dioxide to pass through.

Present small-scale production is for military testing, but sources claim it will be within everyone's reach eventually. Based on pilot-scale production tests at two plants, the fiberboard can be manufactured with equipment like that used to make ordinary building fiberboards, and any species of wood can be pulped to make it.

According to J. A. Hall, director of the Forest Products Laboratory, shelters can be built with the new material to protect troops and civilians.

The new fiberboard, the result of three years of research, was developed by Alfred J. Stamm and Harold Tarkow, both members of the wood chemistry division of USFPL, which is headed by Edward G. Locke. Leonard A. Jonas, Chemical Corps officer, worked closely with them.

Corrosion of Underground Bolt Materials Examined

A recent study by the National Bureau of Standards has shown that electrical measurements made in the laboratory can be useful in predicting

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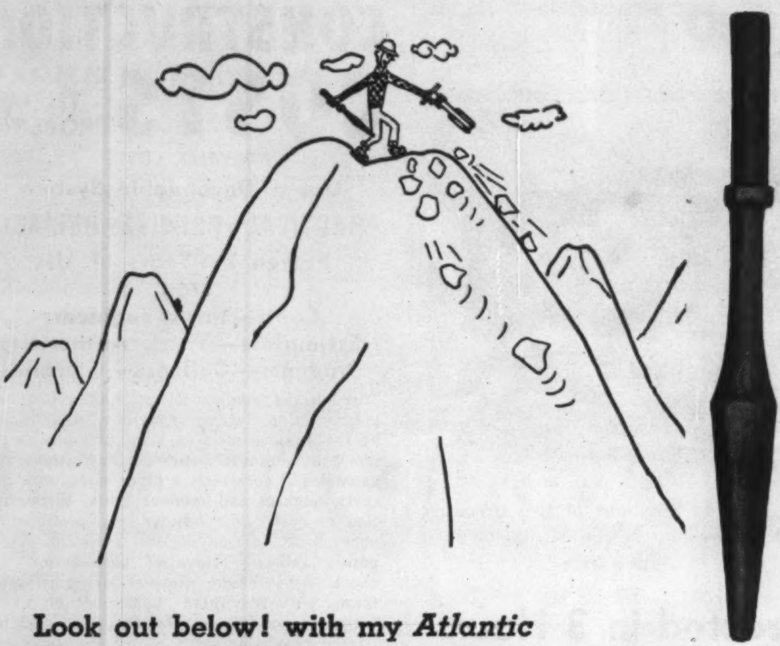

Look out below! with my *Atlantic Pneumatic Rock Breaker* this won't take long!

The Atlantic Pneumatic Rock Breaker breaks rock almost 4½ times faster than the old feather and wedge method! Eliminates slow plug and feather method, explosives, upkeep. Made from specially heat-treated Atlantic Tool Steel. Needs no sharpening, no grinding. Variety of sizes. Fits standard pavement breaking machine. Send for Booklet 3.

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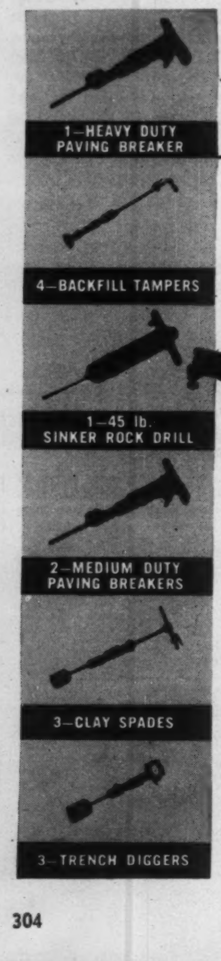
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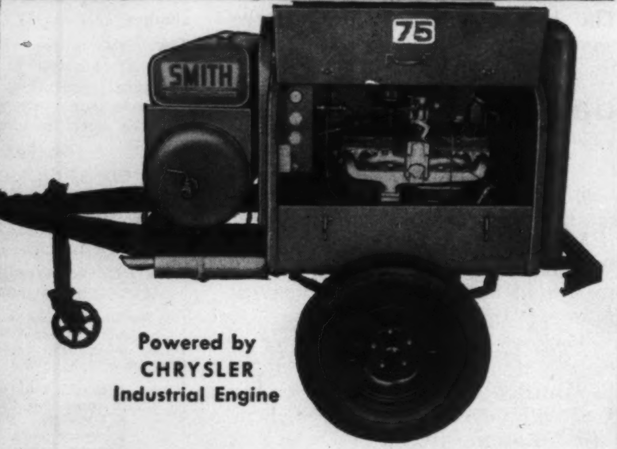

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corrosion resistance of bolt materials used underground. Bolt materials can be protected against corrosion by making them cathodic to the structures which they fasten.

Presumably, bolts and structures made of the same materials should corrode at the same rate. However, it is believed that the many sharp edges on the surface of bolts have an accelerating effect on the corrision rate. In addition, when the soil around the bolt is packed more tightly than the earth around the adjacent structure, corrosion may be further accelerated because of increased galvanic action.

Other workers have found that the addition of 1% copper to cast-iron bolts resulted in a marked reduction of corrosion on the bolts when coupled with plain cast iron. The work of these investigators also suggested the useof a small amount of nickel in ferrous bolts. As extensive use of low-alloy bolts would not result in prohibitive installation costs to industry, such bolts were arbitrarily chosen for the main laboratory study. High-alloy cast-iron and nickel-copper alloy (70-30) bolts were also used.

Experiments Indicate Remedy For Limestone Building Woes

A water solution of sodium methyl siliconate (SC-50) is an effective water repellent for six widely different types of Kansas limestone used for building purposes, tests by F. C. Lanning, Kansas State College research chemist, indicate.

Lanning's experiments showed that limestones treated with the sodium methyl siliconate absorbed little water, and that the rate at which the stone absorbed water increased only slowly during a period of 25 freezing and thawing cycles, which he believes is the equivalent of several years of natural weathering. He also found the coating very durable under infrared radiation, indicating it would resist effects of sunlight.

A solution containing 4% silicone solids gave better water repellency to porous limestones than did a 2% solution. There was no advantage in using a concentration of more than 4%.

Solutions of methyl and ethyl silicone resins dissolved in a solvent such as toluene (SR-53 and C-25) are recommended for brick and concrete structures. They have sometimes been used as water repellents for limestone though they are not recommended for this use.

Owned by George M. Brewster and Son, Inc.—this new Lorain 85, with a 2½-yd. dipper and a 26-ft. boom, is working on the New York Thruway, where contract called for 2½-million yards of grading on a 4.7 mile stretch near Nyack.

New Lorain 85 drives through fluid

for maximum economy and efficiency

The new Lorain 85, recently introduced by the Thew Shovel Co., Lorain, Ohio—features a Twin Disc Fluid Power Take-Off to provide maximum economy and efficiency. The fluid drive unit provides a "cushion" that eliminates shock loads—protecting *both* driving and driven equipment. It prolongs the life of cables and reduces fuel consumption and maintenance costs.

The Lorain 85, shown above, is the *seventy-seventh* Lorain to be purchased through the years by George M. Brewster and Son, Inc., Bogota, N. J. It is one of four new "85's" just added to this well known contractor's fleet. This might be interpreted as a vote of confidence in Thew-Lorain—and in their *standard* component parts.

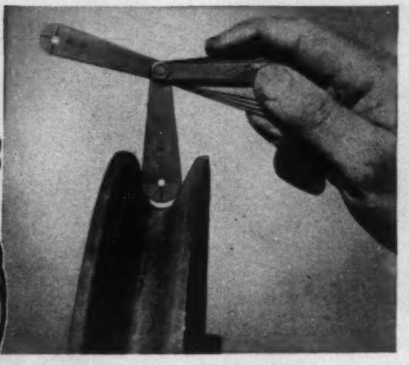
The Twin Disc fluid PTO has been time and job proved on other Lorain models for many years. In fact, Thew-Lorain pioneered the application of fluid power take-offs on power shovels . . . and Twin Disc Fluid Power Take-Offs are *standard* in *all* Thew-Lorain crawler-mounted units in the heavy-duty ¾-yd. and the 1, 2, 2½-yd. classes. Let Twin Disc power linkage specialists help solve *your* particular problem! Twin Disc Clutch Company, Racine, Wisconsin, Hydraulic Division, Rockford, Illinois.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

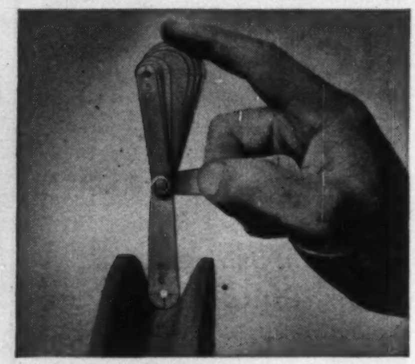
TWIN DISC
Fluid Couplings

Tuffy tips on choosing the

Measure Groove Diameter Accurately

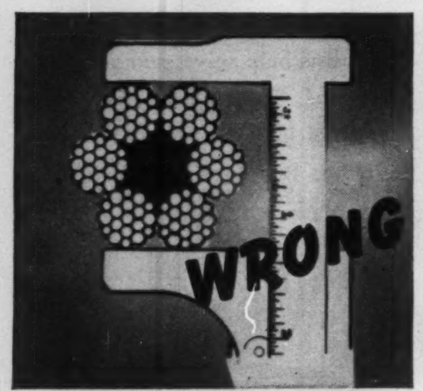


Shown above is the WRONG way to measure the groove diameter. The result—shorter life of the wire rope you buy. Note that only the sides of the rope will bear on the sheave. In a relatively short time this will squeeze the rope out of round and set up destructive friction and stresses on the rope strands and wires. New rope is oversize and diameter of grooves on sheaves and drums should be slightly larger.

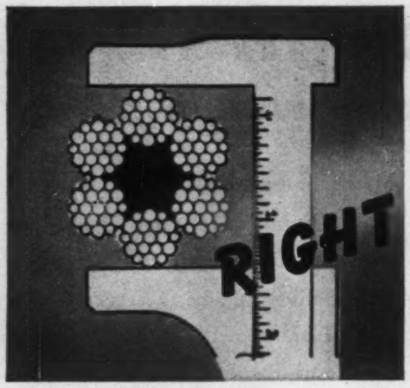


Shown above is the *CORRECT* way to measure the groove diameter. It is a simple thing to do and will give the rope you buy a chance to deliver all the service it possibly can. Remember a wire rope is composed of many closely correlated working parts and sheave grooves which are too large or too small throw them out of alignment. Just like any other working part on a machine, wire rope cannot do its best if it is misfitted.

If Present Rope Is Correct Size, Measure with a Caliper



Measuring the Wrong Diameter is a common mistake that some buyers make when they order replacement rope. When the rope arrives, it turns out to be too small—even though a machinist's caliper was used to assure accuracy. It's an easy mistake to make, but it's just as easy to remember the *right* way and be sure you get the right size rope. Otherwise both the safety factor and service life of the rope will be reduced.



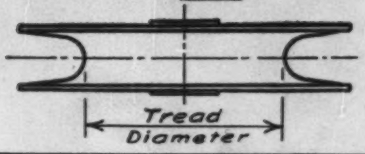
Measuring the Right Diameter is the simple step shown above. Measure so that a single strand is on each of the adjustable edges of the caliper—*not* two strands that measure as a flat side. The actual diameter of a wire rope is the same as that of the circle required to circumscribe it. The diameter of a wire rope is an important factor in determining the safe working load to be handled by your equipment.

Replace Worn Sheaves

When Replacing Rope, check for sheaves that have been badly worn. Sheaves that have grooves corrugated by the rope lay impression should be replaced immediately before installing new rope. Since rope creeps to a certain extent on sheaves these grooves can actually cut the strands as the rope runs over. This will greatly reduce service life of *any* wire rope.

right replacement **Rope**

Beware of Critical Tread Diameters



It is highly important to accurately measure the tread diameter of the smallest sheave or drum on any machine. Here's why. It is on this sheave or drum that the wire rope will get the greatest wear. Some constructions of wire rope will work on smaller tread diameters than others without lessening their service life. Engineers have determined the critical tread diameter for different constructions as shown in the table at the right. Also shown in the table is the minimum recommended tread diameter which is 50% larger than the critical tread diameter.

Example, the tread diameter of your smallest sheave is 24 inches. You know that a 1-inch rope is necessary. Referring to the table at the right you see that the 6 x 19 Warrington or Filler wire is suitable because the minimum tread diameter recommended for it is 24 times the diameter of the 1-inch rope. This gives you a margin of 50% over the critical diameter of 16 inches. If flexibility is a factor in the operation then you would choose the Filler wire type of rope with fiber core.

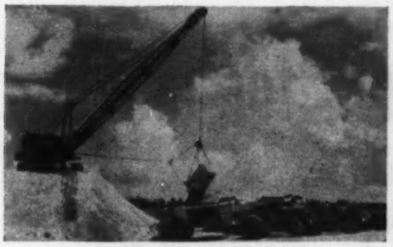
Construction of Rope	Critical Tread Diameter	Minimum Recommended Tread Diameter
6 x 7	28	42
18 x 7	24	36
6 x 19 Seale	20	30
6 x 19 Warrington or Filler Wire	16	24
6 x 31	15	22
8 x 19 Seale	14	21
6 x 37	12	18
8 x 19 Warrington or Filler Wire	12	18

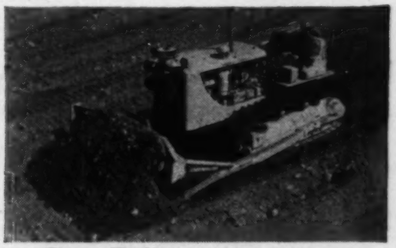
To arrive at critical tread diameter and minimum recommended tread diameter multiply the numbers above by the rope diameter.

Use The "Know How" of *Wire Rope* Specialists

Stemming from many years of cooperation with users and machine builders mastering wire rope problems, is a family of special ropes for special purposes. Into each is incorporated the rope construction, the grade of steel and operating characteristics found to be best for the service for which each is intended.

When you specify one of the* Tuffy *Wire Ropes, you can say Tuffy and forget complicated specifications!





Tuffy Scraper Rope

It's flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Save wasting sound rope—mount a reel on your scraper.

Tuffy Dragline

Constructed to give you maximum abrasive resistance with extra flexibility. Rides smoothly on grooves, hugs the drum when casting for full load.

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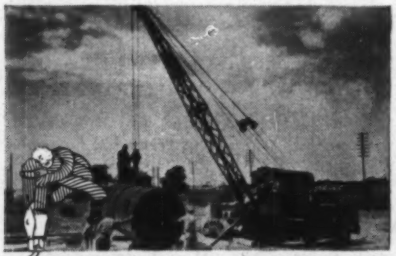

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Tuffy Hoist Line, a longer running rope on all types of hoists. Slings of 9-part machine-braided wire fabric. Kinking or knotting will not materially damage fabric.

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He's the man who can help you find a fast answer to all your wire rope problems. He's also the man who often knows as much about some requirements of your equipment as the men who made it. He's the man who's eager to supply the kind of service that will hold your patronage. Feel free to call on him anytime.

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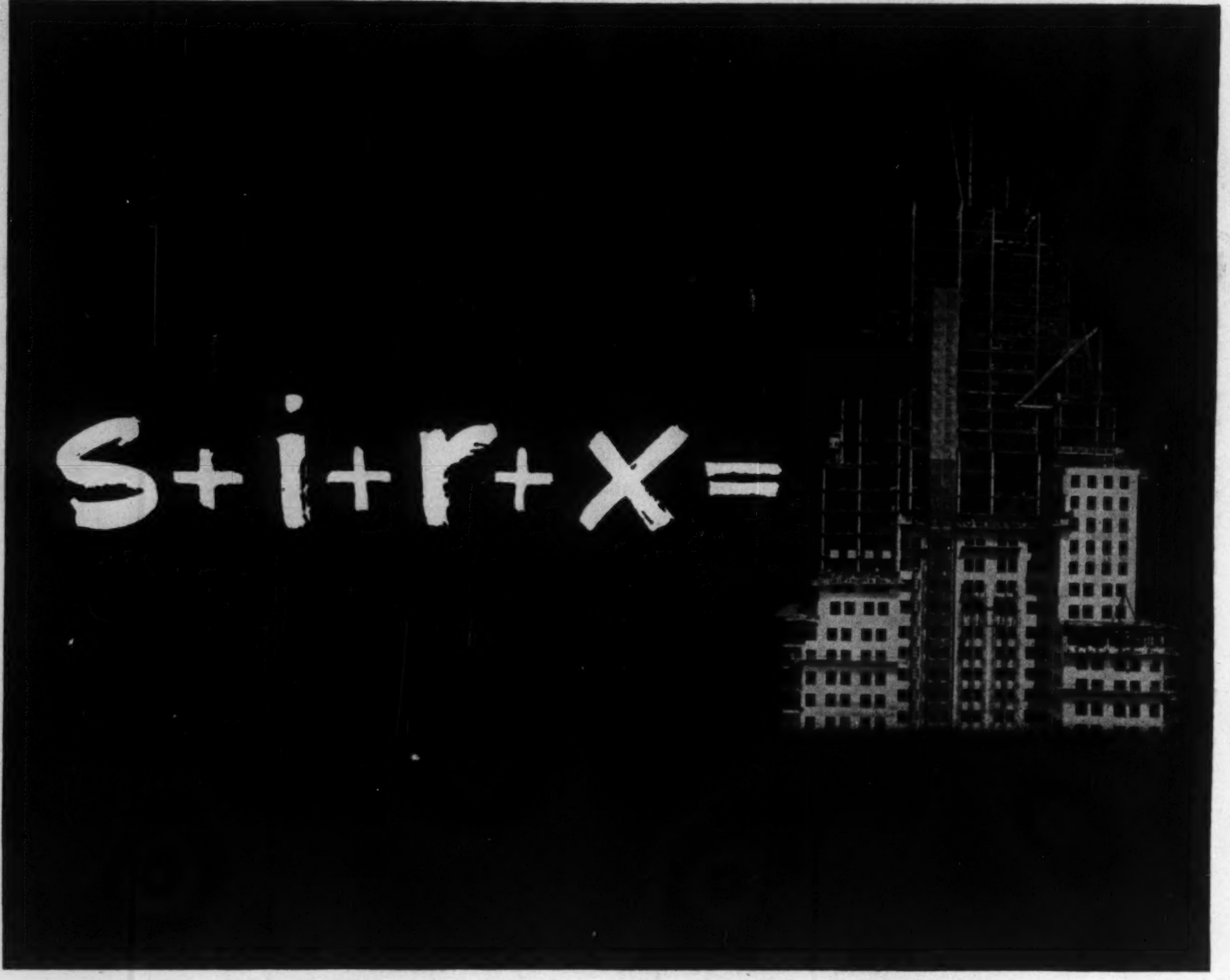

What's the formula for landing a job like this?

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LEGAL

Can You Back Out of a Bid Because an Error Was Made?

Ordinarily, a contractor who makes a mistake in a bid is not allowed to back out of it. But there are exceptions to the rule. Here's a case where relief was granted.

A school district brought an action against a contractor to recover damages resulting from the refusal of the contractor, who was the low bidder, to enter into a contract and his refusal to perform the work required by the proposed contract. The contractor counterclaimed for a judgment permitting him to rescind the bid on the ground of an unintentional mistake in the bid.

The school board made an application to have the counterclaim dismissed and the application was denied.[1] The court held that a unilateral mistake, honestly made and not tainted with fraud, may constitute a defense to such an action, and equity may decree rescission of the bid on a counterclaim. The following authorities were cited to support of the decision: Abner M. Harper, Inc. v. City of Newburgh, 222 N. Y. 670, 119 N. E. 1047; Frank W. O'Connell, Inc. v. Broome County, 198 Misc. 402, 98 N.Y.S. 2d 1009.

In another case[2] where the same issue was involved, the court made this observation: "Ordinarily no relief will be granted to a party to an executory contract in the case of a unilateral mistake. In such a case when a bid has been accepted the bidder who has made a mistake will be bound and must bear the consequences thereof. . . . However, if a party receiving the offer or bid, knows or has reason to know because of the amount of the bid, or otherwise, that the bidder made a mistake, the contract is voidable by the bidder."

[1] Union Free School District No. 1, Town of Islip, v. Grumbs, et al., 133 N.Y.S. 2d 409, Supreme Court of New York, August 3, 1954.

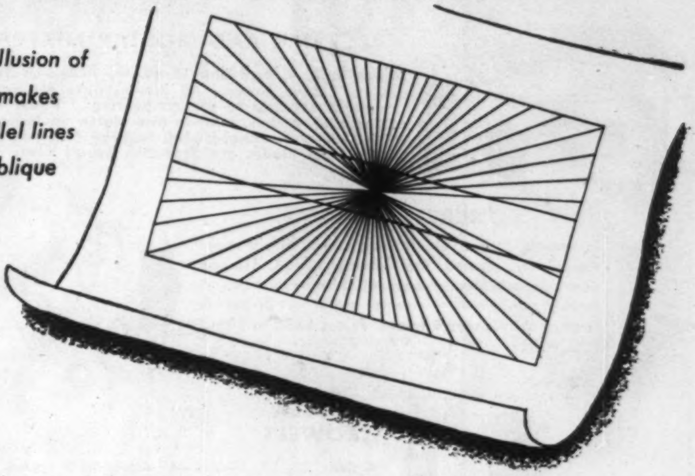
[2] Saligman et al. v. United States, 56 F. Supp. 505.

No Writing, No Contract Because So Contemplated

Under Louisiana law, oral negotiations do not result in a contract until reduced to writing, if the parties contemplated that a written agreement would be the result of the negotiations. Hence there can be no action for breach of contract until then.

The court applied this rule in an action by a contractor to recover

The Strange Case of the
PARALLEL LINES



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$42,802.99 as damages for breach of an oral contract to remove dirt from drainage canals. Defendant established that while negotiations had been had as to the performance of the work, no agreement had been reached as to the price that the contractor was to be paid for the work. Moreover, during the negotiations, it was contemplated that any agreement that might be reached as a result of the negotiations would be reduced to writing and signed by the parties. No written agreement was ever made.

The trial court dismissed the action on the ground that since no price had been agreed upon for the performance of the work, no contract existed. This judgment was affirmed on appeal.[1] The appellate court stated: "It is elementary in our law, that where the negotiations contemplate and provide that there shall be a contract in writing, neither party is bound until the writing is prefected and signed. The distinction is manifest between those cases in which there is a complete verbal contract, which the law does not require to be reduced to writing, and a subsequent agreement that it shall be reduced to writing, and those in which, as in this case, it is part of the bargain that the contract shall be reduced to writing. In the first class of cases the original verbal contract is in no manner impaired by the failure to carry out the subsequent agreement to put it in writing. In the second class of cases, the final consent is suspended; the contract is inchoate, incomplete, and it cannot be enforced until it is signed by all the parties. Villere v. Brognier, 3 Mart., O.S., 326,349; Des Boulets v. Gravier, 1 Mart., N.S., 420,421; Blocker v. Tillman, 4 La. 77,80."

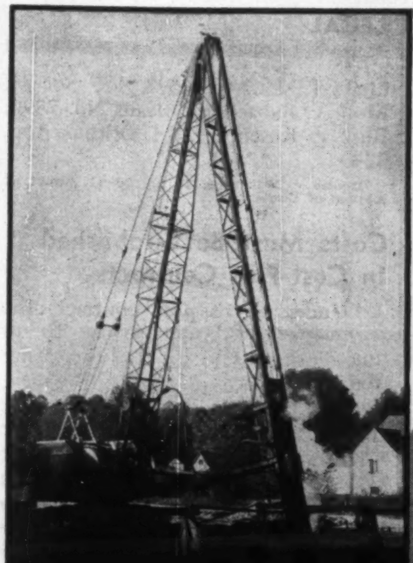
[1] Breaux Brothers Const. Co. v. Associated Contractors, 77 So. 2d 17, Supreme Court of Louisiana, Dec. 13, 1954.

Architect Was Denied Fee When Exceeded Cost Limit

An architect may find himself out on a limb if the structure he planned can't be built within the upset cost limit.

The Supreme Court of Louisiana, for example has followed "the well established rule that where a limit is set, the architect is not entitled to his fee if the plans which he prepares cannot be constructed except by the expenditure of an amount substantially in excess of the limit. See, Rosenthal v. Gauthier, 224 La. 341, 69 So. 2d 367."

Other cases following the same rule include Andry & Feitel v. Ewing, 15 La. App. 272, 130 So. 570; Van Os v.



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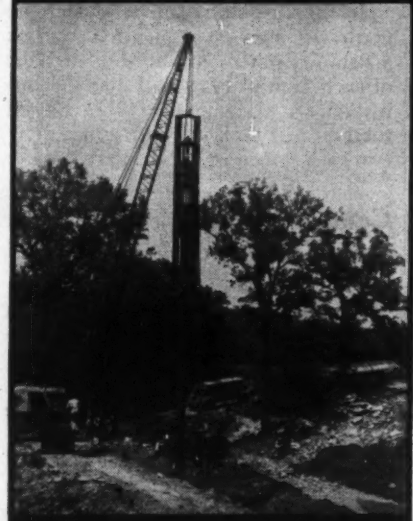

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On-the-job extendibility to virtually any required length, quick cut-offs and ease of handling are additional Monotube features that help builders and contractors save time and money on a wide range of foundation jobs. Write today to The Union Metal Manufacturing Company, Canton 5, Ohio.

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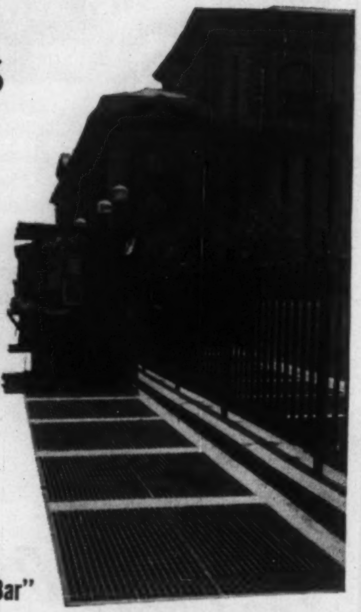
Monotube Foundation Piles



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Gray, 12 La. App. 698, 127 So. 75; Mohr v. Fabacher, Orleans No. 7590; Burk v. Rosenberg, 14 Orleans App. 324.

[1] Bruno v. Williams, 76 So. 2d 41, Court of Appeal of Louisiana.

Costs Must Be Established In Cost-Plus Contracts

"Under a cost-plus contract, the contractor is obligated to use his utmost endeavors to see that the owner gets value received. Lagasse v. Allen, 219 La. 745,746, 54 So. 2d 6. Where there is such a contract to do a job for whatever it might cost, it is implicit that the price charged will not be whatever the contractor sees fit to charge, but will be whatever may be shown to be the reasonable and proper cost. Lee v. National Cylinder Gas Co., La. App., 58 So. 2d 568."[1]

In this case, the court held that the contractor may be required to furnish a detailed statement showing the cost of each item of labor and material furnished. A statement of the alleged total cost, it said, was not sufficient.

[1] Wendel v. Maybury, 75 So. 2d 379, Court of Appeals of Louisiana, March 29, 1954.

Contract Was Changed By an Oral Agreement

It's a general rule that a written agreement cannot be modified by an oral one. But courts have made some exceptions.

One court, for example, has said: "A written contract or agreement may be altered or modified by an oral agreement if the latter has been accepted and acted upon by the parties in such manner as would work a fraud on either party to refuse to enforce it. Carter Realty Co. v. Carlisle, 113 Fla. 143, 151 So. 498,499 and authorities cited; Accord Tussing v. Smith, 125 Fla. 578, 171 So. 238; Moses v. Woodward, 109 Fla. 348, 140 So. 651, 141 So. 117, 147 So. 690."

Harris v. Air Conditioning Corp., 76 So. 2d 877, Supreme Court of Florida, Jan. 7, 1955.

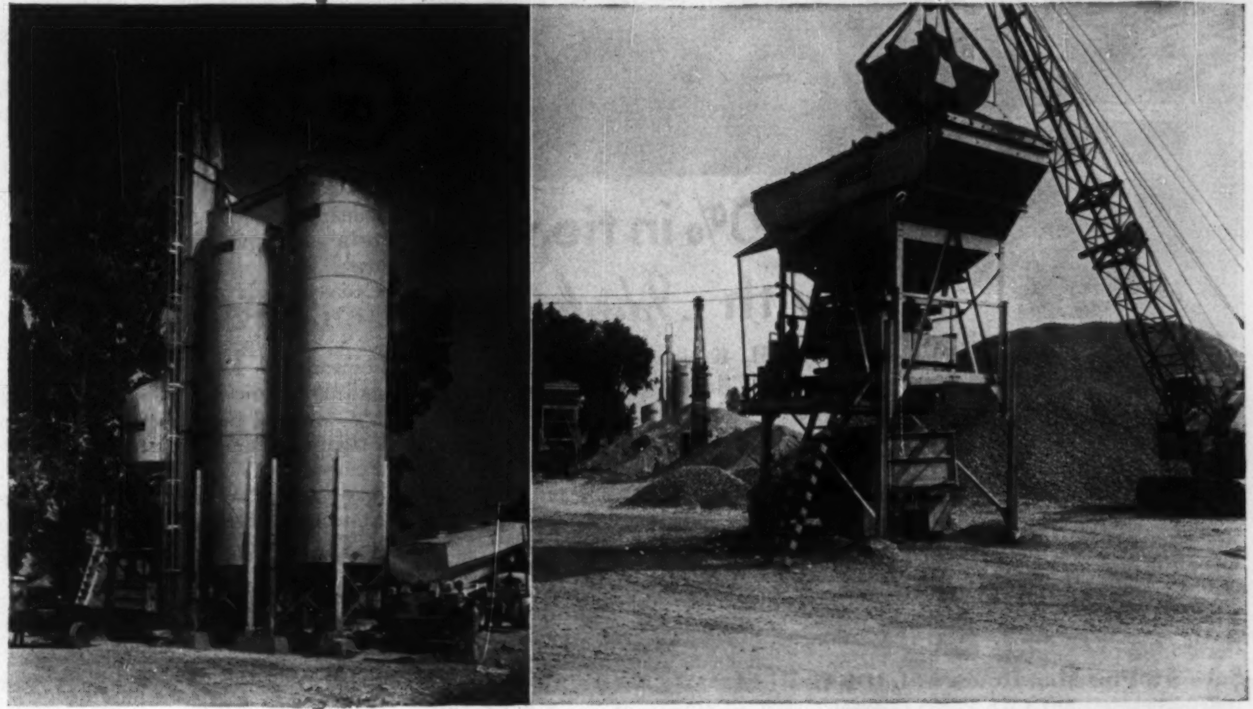
Acceptance Not a Waiver

By accepting and occupying a building the owner does not waive his rights against the contractor for damages resulting from defects in construction, where the owner at the time of accepting the building could not, with reasonable care and diligence have discovered the defects in question.[1]

[1] Svendson v. American Indemnity Co. of Galveston, 76 So. 2d 737, Court of Appeals of Louisiana, Jan. 3, 1955.

(These summaries of court decisions are prepared by I. Vernon Werbin, New York attorney and civil engineer.)

If this Isn't the WORLD'S BATCHING RECORD ...We'd like to know it!



With a BUTLER Roadbuilders Plant as the forward passer on the team, the Sargent Construction Company — on the Ohio Turnpike — laid 4368 lineal feet of concrete pavement 24 feet wide and 10 inches thick — *in one 16 hour day.*

The BUTLER Plant dished up that volume of concrete in 2424 batches.

Slide rules, gentlemen! That's at the rate of over 2½ batches per minute. And mind you, not just for one minute, not for just 10 minutes — but steadily for 16 long, gruelling hours.

The BUTLER Plant tossed these 2424 passes to two 34E pavers working in tandem. Even the large #44 elevator sweated to keep pace with BUTLER (and Sargent) batching.

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21,798 bags of cement batched in 16 hours.
3,148 tons of stone
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Saves 40% in tie wire
. . . with *Ideal Reel*

—says Milbern H. Kane, superintendent for Edgar Stephens Construction Company of Cairo, Illinois

"IDEAL REEL has many advantages over other methods of tying reinforcing steel," says Mr. Kane. "*It eliminates wire waste which we estimate saves us 40% in tie wire.* Saves time, too. Its easy use allows a man to make *at least 25% more ties.*"

Mr. Kane also appreciates the fact that IDEAL REEL is safer and reduces the dangers of permanent eye disability and "*falling with one end of the wire tied to the steel which could cause serious injury, even death.*"

Save $ $ Plus Man Hours with IDEAL REEL. *EASY TO USE,* no training necessary. *CONVENIENT*—reel and wire always at hand, ready for instant use. *PRACTICAL*—being used successfully in diversified wire-tying applications, such as metal lathing, pipe insulation, plant maintenance, stretching lines for batter boards, shipping . . . you name it. *ECONOMICAL*—quickly pays for itself. *SAFE*—approved and recommended by leading insurance companies.

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OBITUARIES

George C. Clarke, 85, civil engineer who helped build many industrial, power and railroad facilities in the U.S. and Canada, died Sept. 5 in New York City. He entered the engineering department of Pennsylvania Railroad in 1891 and rose to resident engineer in charge of construction of its New York City terminal. He also worked in Pittsburgh on the Union Station and railroad yards, and a railroad bridge over the Monongahela River. Clarke was instrumental in forming Fraser-Brace Engineering Co., Ltd., of Montreal. The Canadian phase of his career was spent in the construction of metallurgical plants, pulp and paper mills, and hydroelectric developments, including the Cedar Rapids power plant of Montreal Light, Heat & Power Co. In the U.S., he helped construct the Federal shipyards at Kearney, N. J., a dam and powerhouse at Fifteen-Mile Falls, Vt., for New England Power Co., and Federal ordnance works in Missouri, Pennsylvania and Tennessee. Clarke was graduated from Pennsylvania State College in 1891 and received a civil engineering degree there in 1902.

Cecil L. Reed, 72, retired consulting hydraulic engineer, died Sept. 3 in Charlotte, N. C. A graduate of Clemson College School of Engineering, he lived in Fredericksburg, Va., for some 40 years prior to moving to North Carolina. He was civilian engineer in charge of the construction of Ft. Bragg, N. C. Among other projects that he directed was the construction of Lake Junaluska Dam in western North Carolina.

Henry W. Kendall, 71, chief engineer for Harris Structural Steel Co., New York City, died Sept. 10. He served with the company from 1925 until his retirement in 1945. Among the projects he supervised in the New York area were the West Side Highway and Rip Van Winkle Bridge over the Hudson River.

R. A. Froehlinger, 68, president of Arundel Corporation, Baltimore, Md., died Sept. 8. He had been identified with the construction industry in Baltimore since 1911, when he became associated with Furst-Clark Construction Co. and Maryland Dredging & Contracting Co. When these two firms merged into the Arundel Corporation in 1919, he was named assistant treasurer. Many projects were built for the city under his supervision.

THE BUFFALO-SPRINGFIELD K-45 KOMPACTOR

How to select compaction equipment

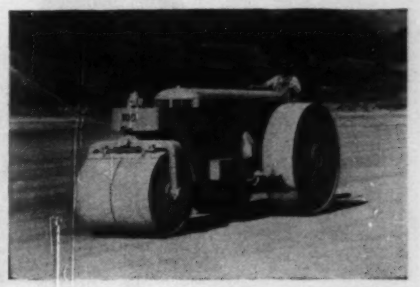
The logical question to ask yourself when you are ready to buy new compaction equipment is: "Exactly what do I need the equipment for and how will I use it?"

BASE FILL COMPACTION—This type of compaction demands equipment that will handle a wide variety of materials, give you the highest degree of compaction with the fewest passes. Buffalo-Springfield's revolutionary K-45 Kompactor is proving a real money-making answer for this type of work. It is self-propelled, relies on the "Interrupted Pressure Principle." All compaction effort is directed downward. Contractors testify they are meeting density requirements in one-fourth the time normally required with other compaction equipment.

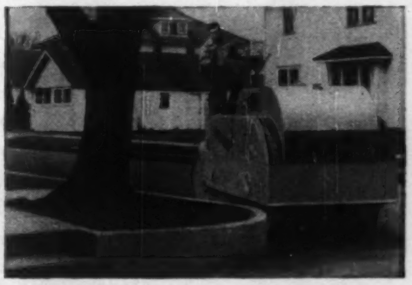
FINE GRADE FINISHING—Buffalo-Springfield offers six 3-wheel rollers, ranging in capacity from 5 to 15 tons, to handle the large variety of materials found in fills, subgrades and unfinished bituminous pavements. The variable-weight 3-wheel roller is ruggedly built for years and years of hard, maintenance-free work.

Buffalo-Springfield's thoroughly-proved 3-axle tandem "walking beam" roller provides up to 60% greater tonnage compacted per day in superhighway construction, airport and military establishment jobs where specifications are extra strict.

ASPHALT FINISHING—Two-axle Tandem Rollers are designed especially for all surface finishing jobs. Ranging from 5 to 16 tons, Buffalo-Springfield Tandems are used for heavy-duty highway and public works projects, and all types of finishing, maintenance and repair work. A wide selection of models for the biggest to the smallest jobs are designed for long-life and profitable operation.



3-WHEEL ROLLERS

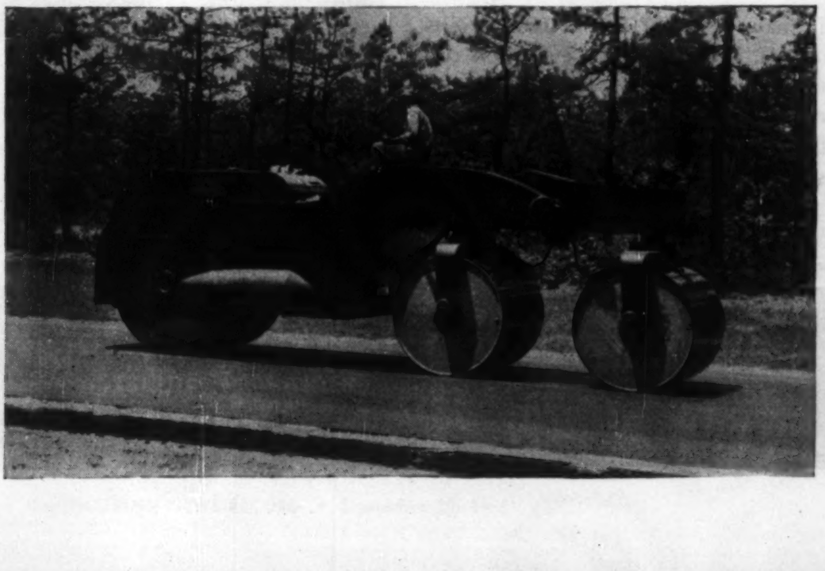


TWO AXLE TANDEMS

SHORT ROLLING JOBS—Buffalo-Springfield's 3-5 ton portable roller is widely used for rolling driveways, sidewalks, parking and playground areas, and for patching and light finishing jobs. It is highly maneuverable and portable from job-to-job. Write today for full information on the type of equipment you need—or see your nearest distributor for an on-the-job demonstration.

3-5 TON PORTABLE TANDEM

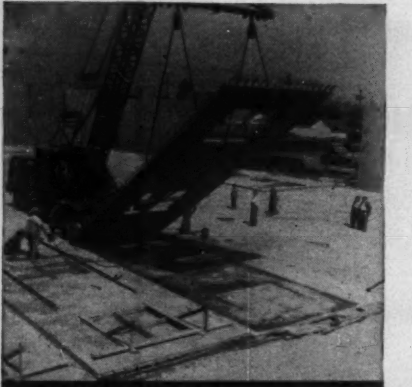
THE BUFFALO-SPRINGFIELD KX-3 AXLE TANDEM



The Standard of Comparison

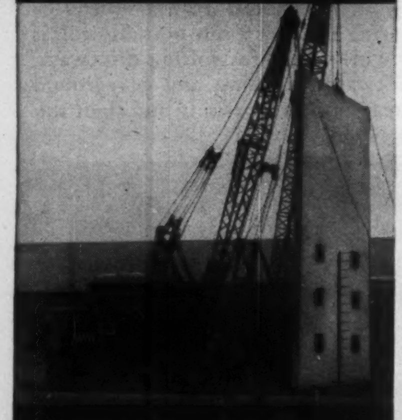
BUFFALO SPRINGFIELD

SPRINGFIELD, OHIO

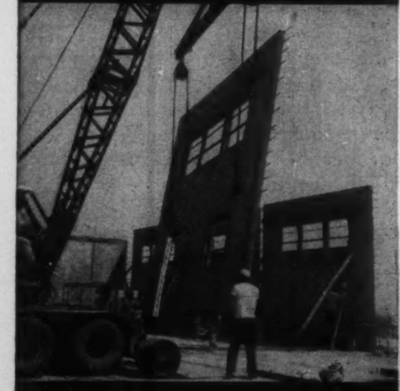


PRECAST PANEL 32' high, 18½' wide with two large window areas.

TRUSS has 60' span at top



114,000 LB. SLAB being positioned



PANEL with door and two window areas

SUPERIOR

Complete Accessories Plus Experience on Tilt-Up Jobs!

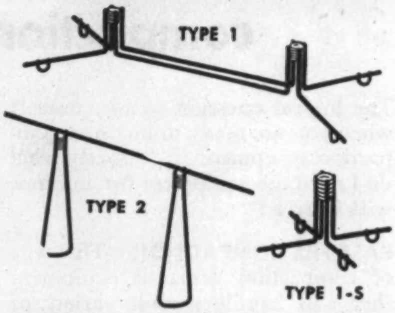
On every Tilt-Up job the proper type of Pick-Up Inserts and Brace Anchors as well as their location in the slab or precast structural member are of prime importance in order to withstand the stresses occurring when *tilting, lifting,* and *positioning*. As pioneers in this field, SUPERIOR has developed various types of accessories and correct procedures resulting from the experience of thousands of job applications.

SUPERIOR accessories are designed for fast and efficient handling of all types of precast panels and structural members. The Pick-Up Insert provides dependable anchorage for bolts which secure a lifting angle to which slings are attached when the panel is raised. Brace Anchors secure the temporary bolts by which the Braces are attached. The exclusive pivoting action of the adjustable Braces permits quick positioning and alignment of panels. Braces are assembled with 2 x 4's or pipe of lengths to fit job conditions.

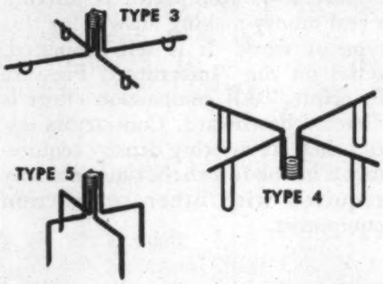
The many types of SUPERIOR Inserts, Anchors, and Braces for every job condition together with complete layout service provide a combination which offers safe and efficient handling of precast panels and structural members.

For further details refer to Sweet's Catalog or send for Bulletin TU-3.

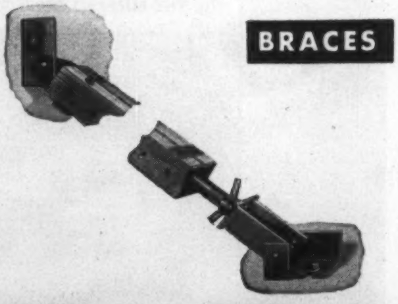
PICK-UP INSERTS



ANCHORS for BRACES



BRACES



SUPERIOR CONCRETE ACCESSORIES, INC.
4110 Wrightwood Avenue, Chicago 39, Illinois

New York Office
1775 Broadway, New York 19, N. Y.

Pacific Coast Plant
2100 Williams St., San Leandro, Calif.

Equipment Rental, Calif.

Continued from page 224

Type of equipment	Rate/ hr
Trailers, pole type, single axle	$0.65
Pole type, tandem axle, 18-ton pay load	1.30
Float or semi, 12½-ton pay load	1.00
Full four-wheel, 12½-ton pay load	1.10
Tandem float, 30-ton pay load	3.25
Low boy carry-all, 10–15 ton capacity	1.95
20–25 ton	2.60
30–35 ton	3.25
40–60 ton	3.90

NOTE: Manufacturer's authorized maximum weight rating, or gross vehicle weight, GVW, is greatest weight of vehicle and load the manufacturer authorizes and guarantees the vehicle to accommodate with safety under normal conditions. This includes weights of chassis, cab, special equipment, body and body contents (pay load) and of largest tires authorized by manufacturer for the vehicle.

Capacity ratings for rental pricing purposes

GVW, Mlbs	tons	GVW, Mlbs	tons	GVW, Mlbs	tons
12.5–14	1½	20.5–22	3½	28.5–30	5½
14.5–16	2	22.5–24	4	30.5–44	6–9
16.5–18	2½	24.5–26	4½	46.0–62	10–14
18.5–20	3	26.5–28	5	64.0–74	15–18

(Provided that the addition of a 2-speed axle or tandem drive to standard equipment may not be used to increase GVW of unit)

Vibrators, concrete, gasoline, pneumatic or electric powered, including vibrator heads and shafting	$0.65

Welding machines, gasoline or Diesel engine driven, AC or DC, incl helmets, holders, 60 ft ground & welding cable

to & incl 250 amp	$1.00	350–500 amp	$1.75
250–350 amp	1.30	500–700 amp	2.30

when truck mounted, add rate for size of truck used

additional cable, for each 60 ft or less	0.15

Fast Equipment Depreciation

The faster depreciation methods authorized by the 1954 tax law, reported in detail ENR 7/29/54 and 9/30/54, use these formulas:

- **Declining balance method**—This permits writing off about two-thirds of original cost in the first half of machine's useful life. First you figure depreciation by the old straight-line method. Then you double the first-year write-off and apply it to the full cost of the asset. Next year you repeat this on the balance of the original cost that is left.

For example, on a $15,000 tractor with a 5-year life, the straight-line depreciation would be $3,000/yr. Under the declining balance method it would be double that the first year or $6,000. The second year allowable straight-line depreciation on balance would be ⅕th of $9,000 or $1,800, thus the declining balance depreciation would be $3,600. And so on.

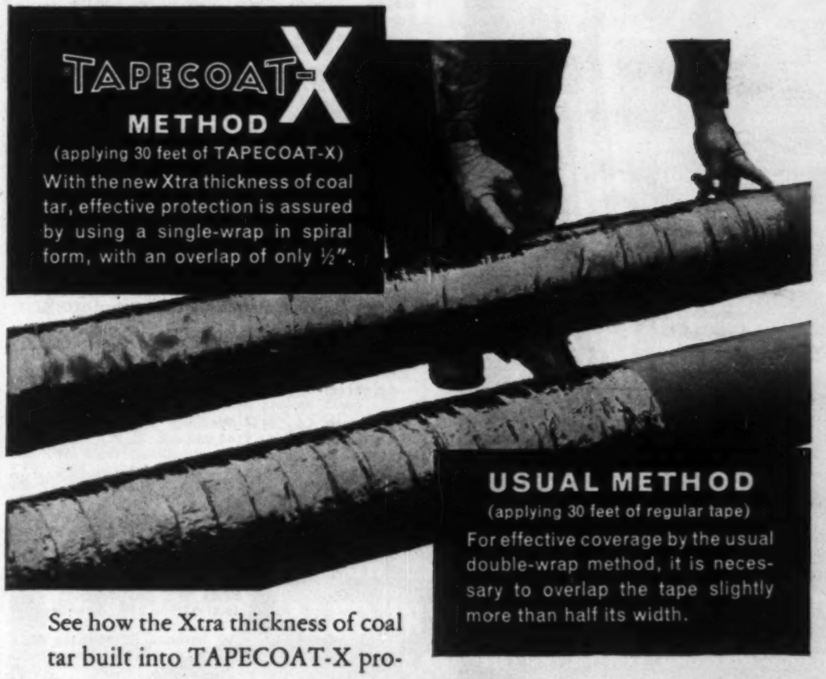
- **Sum-of-the-years'-digits method**—This allows you to write off about ¾ths of the original cost in the first half of useful life. It also permits complete recovery of original cost compared with an unrecovered 8-13% under declining balance formula. It works like this:

Say the machine has a 5-year life, the first year is 5/15. Here the numerator is the remaining useful life, the denominator is the sum of the years' digits for the original useful life—in this case 1+2+3+4+5=15. In the 2nd year the rate is 4/15, in the 3rd, 3/15 and so on.

For XTRA COVERAGE

Specify ®TAPECOAT-X

. . . the time-tested quality coal tar coating in tape form . . . now made with Xtra thickness of coal tar to go farther, faster *on pipe, pipe joints, fittings, mechanical couplings, tanks and other surfaces vulnerable to corrosion.*



TAPECOAT-X METHOD

(applying 30 feet of TAPECOAT-X)

With the new Xtra thickness of coal tar, effective protection is assured by using a single-wrap in spiral form, with an overlap of only ½".

USUAL METHOD

(applying 30 feet of regular tape)

For effective coverage by the usual double-wrap method, it is necessary to overlap the tape slightly more than half its width.

See how the Xtra thickness of coal tar built into TAPECOAT-X provides extra protection per foot of tape. This extra thickness of coal tar, made possible by a new exclusive process, permits a single-wrap application that can be applied faster and over a greater area for savings in labor, material, time and money.

These and other practical advantages make it worth your while to get the complete details on TAPECOAT-X.

Write for literature today

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ORIGINATORS OF COAL TAR COATING IN TAPE FORM

1551 Lyons St., Evanston, Illinois

AS AN ENGINEER

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PEN
ACTUAL SIZE
Yellow or white leads also available

You work with complex ideas. Do you "see" them quickly enough? You can with the new NORMA Pen and 3-Pencil Combination. It writes in 3 colors of pencil and as a pen . . . gives greater visual clarity . . . saves time! Guaranteed for mechanical perfection by NORMA, makers of quality Multikolor Pencils for over 25 years.

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CLICK Blue Pencil!
CLICK Red Pencil!
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CITY__________ZONE No.____STATE________

CONSTRUCTION REPORTS — First Section

Bids Asked—Low Bidders—Contracts Awarded

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager

J. A. MAHONEY, M. WETZEL, L. M. WINISKI, M. E. SCIORRA, F. S. DEMBEK, Reports.
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

Mass., Beverly—FIRE STATION—BA 10/4—City, Central Fire Station, Hale St., fire station, Beverly Farms. $102,000. Mahoney Assoc., 72 Loring Ave., Salem, archts.

† **Massachusetts**—BUILDINGS for SPECIAL AAA FACILITIES—BA On Or About 10/6—U. S. Eng., 857 Commonwealth Ave., Boston, Zone 15, constr. addnl. bldgs. for Special AAA Facilities in Boston area, located at following locations: (a) Site B-03 Reading control and launcher areas, (b) Site B-17 Nahant control and launcher areas, (c) Site B-36 Hog Island control area and Weymouth launcher area, (d) Site B-37 Squantum control area and Long Island launcher area, (e) Site B-55 Blue Hills control and launcher areas, (f) Site B-63 Needham control and launcher areas, (g) Site B-73 Lincoln control area and Wayland launcher area, (h) Site B-84 Burlington control and launcher areas. $150,000-$200,000. Plans deposit $10. CD 3/29.

HEAVY CONSTRUCTION—LB & CA

MAINE—State Hy. Comn., State House, Augusta,
Forest Frederick, Pittsfield, Me. LB **$265,825.** b. conc. 3.617 mi. F.A. Secondary Proj. S 0298-(4), "298" Franklin and Twp. 9 S. D. Bids Sept. 14. CD 9/7.

† **Seaward Constr. Co., Inc.**, Badgers Island, Kittery, Me. LB **$175,310,** est. $180,000. electrical distr. lines for tactical facilities, Loring Air Force Base, ENG-19-016-56-27, LIMESTONE, ME. U. S. Eng., 857 Commonwealth Ave., Boston, Mass.

NEW HAMPSHIRE—State Dpt. P. Wks. & Hys., State House Annex, Concord,
Cooke-Ross, Inc., 70 Main St., Torrington, Conn. LB **$284,408,** Class C-2 road mix hy. 2.502 mi. and 25 ft. rein.-con. frame bridge, Stratford. Bids Sept. 15. CD 9/8.

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
Farina Bros. Co., 429 Watertown St., Newton, Mass. CA **$5,469,289,** est. $5,500,000. grade crossing elimination Mill and Norman Sts., Salem. CD 8/12, under LB.

MASSACHUSETTS—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
John McCourt Co., 910 Huntington Ave., Boston, Mass. LB **$112,765,** est. $120,000. hy. work Dorchester St., South Boston. Bids Sept. 13. CD 9/8.

AAA Constr. Co., 1135 Plainfield St., Johnston, R. I., LB **$138,000,** est. $140,000. R. I. Proj. No. 1, 2, constr. and finish site alterations, Roger Williams Homes, PROVIDENCE, R. I. City Housing Auth., 263 Chad Brown St., Providence, R. I. CD 3/7/50, under Public Buildings .

▲† **The Associated Constr. Co.**, 1010 Wethersfield Ave., Hartford, Conn., CA, **$792,726,** Contract A, CA, **$956,277,** Contract C, Special AAA Facilities East Windsor, Manchester, Glastonbury and Cromwell, Middletown, Hartford Area, ENG-19-016-54-6, CONNECTICUT. U. S. Eng., 857 Commonwealth Ave., Boston, Mass. Grand total $2,552,112. Bids Sept. 7. CD 9/13, under LB.
Wexler Constr. Co., 118 Needham St., Newton Highlands, Mass., CA, **$803,115.** Contract B (Connecticut).

BUILDINGS—LB & CA

▲ **J. F. Rand & Sons**, 57 Sudbury St., Boston, Mass. LB **$1,170,383.** Acton-Foxboro Regional HIGH SCHOOL, ACTON, MASS. Acton-Foxboro Regional High School Dist., Supt. Schools, High St., Acton, Mass. Bids Sept. 14. CD 8/23.

Park Constr. Co., Inc., 40 Court St., Boston, Mass. CA **$641,000.** M-402 Contr. 1, SERVICE BLDG. addn., Walter E. Fernald State School, Waverly (Section Belmont), WALTHAM, MASS. State, Dpt. Mental Health, c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. CD 8/17, under LB.

DelSignore Constr. Corp., 1 Pleasant View St., Worcester, Mass. CA **$589,987,** est. $600,000. M-504 Contr. 1, REFRIGERATION KITCHEN and CAFETERIA alterations, WORCESTER, MASS. State, Dpt. Mental Health, c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. Thomas T. Amirian, 31 St. James Ave., Boston, Mass., struct. engr. CD 8/10, under LB.

J. H. Hogan, 78 Butler St., New Haven, Conn., CA Est. **$600,000.** Basset Junior High SCHOOL addn., NEW HAVEN, CONN. City, Justin L. O'Brien, supt. Schools, 169 Church St., New Haven, Conn. Bids Aug. 15. CD 9/13, under LB.

▲ **The Wadhams & May Co.**, 15 Lewis St., Hartford, Conn., LB, **$2,236,004.** Contr. 54-C-405 AA, HIGH SCHOOL, South Elm St., WALLINGFORD, CONN. Town, c/o Supt. Schools, at Moses Y. Beach School, Wallingford, Conn. Bids Sept. 13. CD 8/12.

Giuca Constr. Co., 1170 Farmington Ave., West Hartford, Conn., CA, **$140,000.** PLANT, WEST HARTFORD, CONN. Oil Heat & Eng. Co., 692 Maple Ave., Hartford, Conn. Kirk Fletcher Richetts, 462 Ridge Rd., Wethersfield, Conn., archt.

▲ **Fusco-Amatruda Co.**, 59 Amity Rd., New Haven, Conn., CA, **$1,289,000.** Harry M. Bailey Junior HIGH SCHOOL, WEST HAVEN, CONN. Bd. Educ., Town Hall, West Haven, Conn. Bids Aug. 31. CD 9/7, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

New York—BA 10/4—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, Contr. I-T-16, installation of barminutor in grit chamber, Tallmans Island Pollution Control Proj., Queens Boro. Plans deposit $10.

▲ **New York**—BA 10/4—New York City Transit Auth., 370 Jay St., Brooklyn, Zone 1, DeKalb Avenue reconstr. (revised) general constr. Sections 1 and 2 in Brooklyn Boro, Contr. C-102. Bids 8/26 rejected. CD 9/9, under LB.

D. C., Wash.—BA 10/5—D. C. Govt., Dpt. Hys., 499 Pennsylvania Ave., N.W., constr. 2 bridges over Watts Branch at 44 St. and Gault Pl. N.E. Plans deposit $20.

Md., Rockville—BA 10/5—Montgomery Co. P. Wks. Office, M. A. Butcher, dir., County Office Bldg., Contr. S-693, drainage facilities along Lawndale Drive and Flower Ave. in Indian Spring Estates. Plans deposit $5.

▲† **N. Y., Plattsburgh**—AIRFIELD FACILITIES—BA 10/13—U. S. Eng., 111 E. 16 St., New York, Zone 3, airfield facilities, package No. 1, grading, POL facilities at Plattsburgh Air Force Base, ENG-30-075-56-92. $1,000,000-$1,500,000. Plans deposit $10. CD 7/-16/54.

† **N. Y., Plattsburgh**—SHOP—BA 10/13—U. S. Eng., 111 E. 16 St., New York, Zone 3, base maintenance shop addn., Plattsburgh Air Force Base. $100,000-$500,000. CD 9/14.

N. Y., Mineola—BA 10/18—Nassau Co. Executive, Old County Court House, lateral sewers at New Hyde Park, Stewart Manor and vicinty, towns of Hempstead and North Hempstead, sewage collection Dist. No. 2-NHP, Contr. No. 1002-2NHP-1. Plans deposit $25. CD 6/13.

† **Md., Andrews Air Force Base**—OPERATIONS AND TRAINING BLDG.—BA On Or About 10/20—U. S. Eng., First and Douglas Sts. N.W., Wash. 25, D. C., air national guard operations and training bldg., ENG-49-080-56-17-(18). CD 8/9/54.

PROJECTS COVERED

By Size

Construction projects here reported cover the Unite States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings, $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listings)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England
Middle Atlantic
South
Middle West
West of Mississippi
Far West

PROPOSED WORK
Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Public Buildings
Mass Housing
Commercial Buildnigs
Industrial Buildnigs
Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily issue in which last previous report was published.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see Construction Daily.

BUILDINGS—BA

Md., Baltimore—SCHOOL—**BA 10/5—City, Bureau Bldg.** Constr., 410 Municipal Bldg., Zone 2, 1 and 2 story, addn. to Glenmount School No. 235, Glenmore, Walther and Ina Aves. $500,000. Plans deposit $50. F. L. W. Moehle & Assoc., 2514 N. Charles St., Zone 18, archts. CD 4/1/52.

▲ **N. Y., Brooklyn**—COURT BLDG.—**BA 10/5**—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, Contr. B1 general constr., Contr. B2 plumbing work, Contr. B3 heating and ventilating work, Contr. B4 electrical work for constr. of new supreme court bldg., Brooklyn Civic Center, Phase B, Plans deposit $100. Extended date. CD 8/11.

N. Y., New York—SCHOOL—**BA 10/10—Bureau Constr.,** 42-15 Crescent St., Long Island City, Zone 1, modernize and convert P. S. 82, Macombs Rd. and W. 176 St. The Bronx, to Junior High School. Plans deposit $15 general constr., $8 plumbing and drainage, $5 heating and ventilating, $7 electrical work and lighting fixtures.

N. Y., New York—DORMITORY—**BA 10/10—Manhattan** College, at office Eggers & Higgins, archts., 100 E. 42 St., student dormitory. CD 5/3.

▲ **N. Y., New York**—SCHOOL—**BA 10/18—Bd. Educ.,** Bureau Constr., 42-15 Crescent St., Long Island City, Zone 1, P. S. 64, 9th St. and Ave. B, Manhattan, modernization and conversion to Junior High School, $1,094,000. Plans deposit $10 general, $8 each plumbing & drainage, heating & ventilating, electrical & lighting fixtures. CD 3/2.

▲ **N. Y., Brooklyn**—HOSPITAL—**BA** In 2 to 3 weeks—Methodist Hospital of Brooklyn, 6 St. and Seventh Aves., (selected list bidders), hospital, Sixth St. adjacent to existing. bldg. $4,000,000, Slocum & Fuller, 207 E. 32 St., New York, Zone 16, consult. engrs. Rogers & Butler, 219 E. 44 St., New York, Zone 17, archts. CD 5/26.

BUILDINGS—LB & CA

▲ **Lightning Electric Service Co.,** 11 Coes Place, Newark, N. J. and **Fischbach & Moore, Inc.,** 226 E. 41 St., New York, N. Y. CA **$2,271,500.** 3 mi. continuous fluorescent lighting in Third Tube of Lincoln Tunnel, NEW YORK-NEW JERSEY. Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. CD 1/18/54.

▲ **NEW YORK**—Bureau Contracts & Account, The Gov. Alfred E. Smith State Office Bldg., Albany,

N. Y.—Johnson, Drake & Piper, Inc., 86 Trinity Pl., New York 6, N. Y. CA **$3,547,010,** est. $4,950,000. (8 bidders) New York State Thruway-Erie Sect.-subd. E-1B (Barden Rd. to Westfield) and 5 marginal or cross roads 5.32 (acc. 1.94) mi. E. T. 55-4, S. T. 55-6, Chautauqua Co.;

N. Y.—Louis Mayersohn, 36 State St., Albany, N. Y. CA **$664,853,** est. $727,000. (5 bidders) Gouverneur-Edwards Pts. 1 and 2, S. H. 1263-1389, 3.96 mi. FARC 55-70, St. Lawrence Co. Bids Aug. 25, awarded Sept. 7. CD 8/31, under LB.

Charles F. Vachris, Inc., 9024 Ditmas Ave., Brooklyn, 36, N. Y. LB **$519,200** (6 bidders) Contr. B. P. 55-51 Part III, beach protection (4 stone groins) at Atlantic Beach, town of Hempstead, Nassau Co., NEW YORK. Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany, N. Y. Bids Sept. 15, CD 8/29;
Peter Bistrian, Abrams Landing Rd., Amagansett, N. Y. LB **$81,000** (7 bidders) Contr. BP. 55-34A, beach protection (exten. of stone groins) Troy and Clayton Aves., East Atlantic Beach, town of Hempstead. (New York).

▲ **Gull Contg. Co., Inc.,** 33-15 Lawrence St., Flushing, N. Y. CA **$1,717,627.** Contr. LT-160.020 Lincoln Tunnel Third Tube N. Y. Approach Section No. 2, NEW YORK. Port of New York Auth., 111 8th Ave., New York 11, N. Y. CD 7/27, under LB.

▲† **Great Lakes Dredge & Dock Co.,** Morgan Bldg., Buffalo, N. Y. LB **$1,298,491,** est. $1,276,336. Buffalo Harbor Deepening Proj., CIVENG-30-023-56-4, NEW YORK. U. S. Eng., Engineer Park, Niagara and Bridge Sts., Buffalo, N. Y. Bids Sept. 8. CD 8/10.

Harmel Constructors, Inc., 60 E. 42 St., New York, N. Y. CA **$98,476.** two bldgs. for storage of flammable materials adjacent to Hangers 1 and 2 in northern section of New York International Airport, IDLEWILD, N. Y. The Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. Bids Aug. 16 CD 7/19.

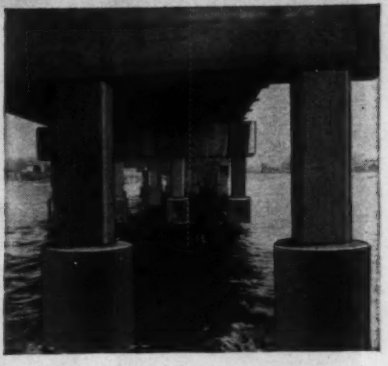
Slattery Rock Corp., 46-36 54 Rd., Maspeth, N. Y. LB **$419,750.** (2 bidders) replacement of beach sand and exten. of riprap jetty at Orchard Beach, Pelham Bay Park, Bronx Boro, Contr. X-39-255, NEW YORK, N. Y. Comr. Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and Fifth Ave., New York 21, N. Y. Bids Sept. 14. CD 9/8.

Teller Paving & Contg. Corp., 389 E. 167 St., New York 56, N. Y. LB **$256,000.** playground and completion of ballfields in area from Metcalf Ave. to Bronx River between Randall and Lafayette Aves. Soundview Park, Bronx Boro, Contr. X-118-154, NEW YORK, N. Y. Comr. Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and Fifth Ave., New York 21, N. Y. Bids Sept. 16. CD 9/8.

(Continued on page 324)

FOR BRIDGES and PIERS

BEFORE *DRI-POR*



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How DRI-POR reduces your Pile-Repair Costs:

Whenever bridge or pier piles stand in water, the concrete within the tide range becomes eroded as a result of freezing-thawing, chemical action and other factors.

The DRI-POR System makes it possible to repair damaged piles *"in the dry"* through the use of a patented "K-Box," especially developed for this purpose. There is ample room for a man to work in the de-watered "K-Box," while visual inspection of the repairs can be made by your own engineer.

Reinforced steel is replaced by welding. DRI-POR admixtures increase the density, impermeability, and frost and chemical resistance of the encasement. By eliminating many costly job procedures and providing longer-lasting repairs, the DRI-POR System results in lower cost in the long run.

We will be glad to send you literature, detailed information, and specifications to prove the superiority of the DRI-POR System for pile repairs.

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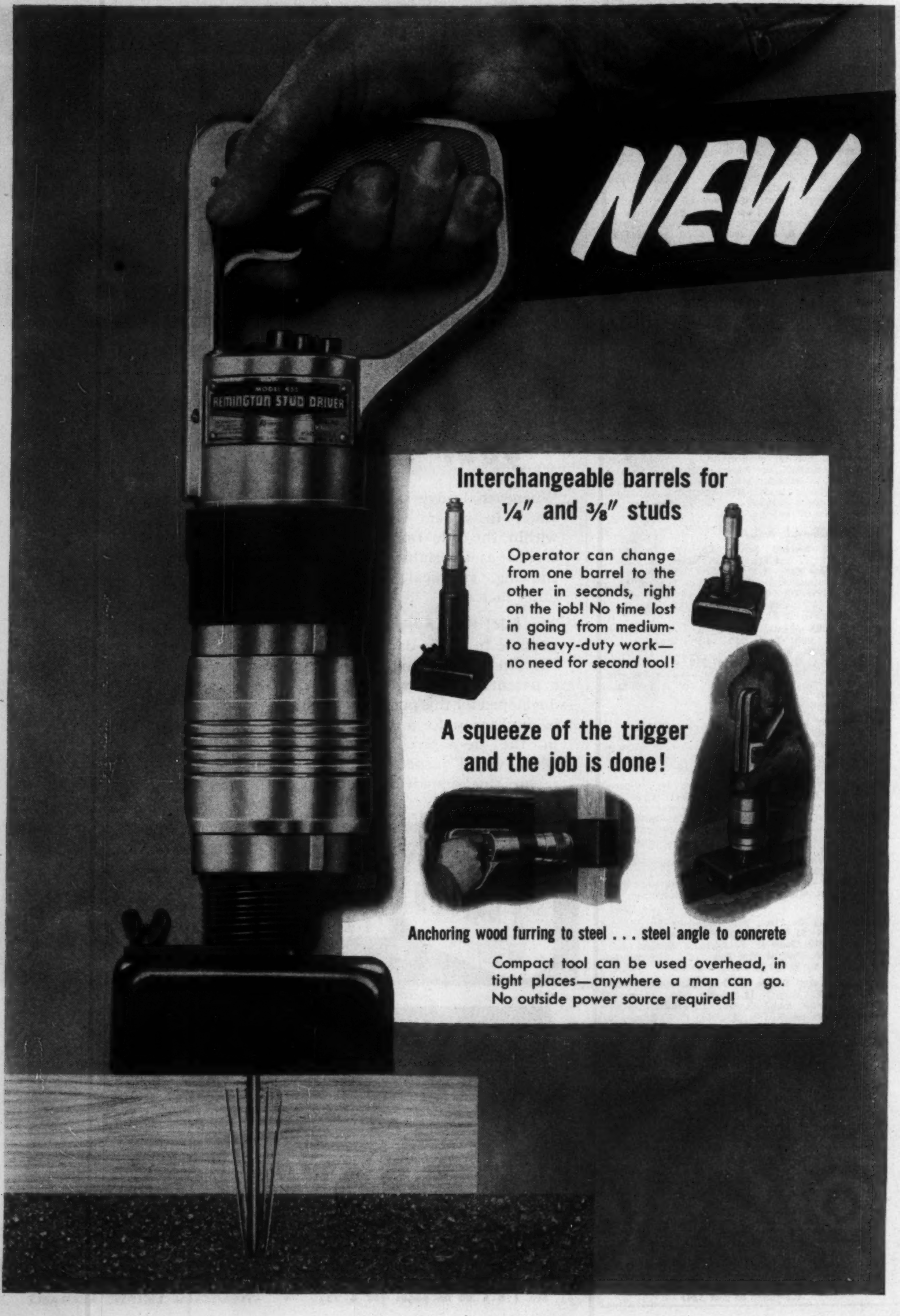
11 W. 46TH ST.
N.Y.C.

See J & L ad on pages 132 & 133 • TERRITORIAL LICENSES AVAILABLE



Interchangeable barrels for ¼″ and ⅜″ studs

Operator can change from one barrel to the other in seconds, right on the job! No time lost in going from medium- to heavy-duty work—no need for *second* tool!

A squeeze of the trigger and the job is done!

Anchoring wood furring to steel . . . steel angle to concrete

Compact tool can be used overhead, in tight places—anywhere a man can go. No outside power source required!

tool cuts costs on all stud fastening jobs!

with the Double-Duty

REMINGTON STUD DRIVER

You can anchor both ¼″ and ⅜″ studs in steel or concrete . . . instantly!

Here's the first cartridge-powered tool that can cut your costs on practically all construction fastening—light, medium and heavy duty. It's the new Model 455 Remington Stud Driver!

The secret of this amazing versatility lies in the tool's construction. *Two* sizes of studs can be used—¼″ and ⅜″. Changeover in barrels takes only 90 seconds *right on the job*. With either size, an operator can set up to 6 studs per minute . . . anchor conduit clips, wood sections, steel frames and many more fixtures with a squeeze of the trigger!

What powers the Stud Driver? Remington 22 and 32 caliber cartridges for the ¼″ and ⅜″ studs respectively. For special medium-duty applications, the smaller cartridge may be used with the larger stud, giving an extra-strong fastening at a saving. Every stud is driven arrow-straight, whatever the combination.

GET ALL THE FACTS about this new, useful fastening tool that goes anywhere, works anywhere—without wires or cables, hammering or predrilling. The Model 455 Remington Stud Driver makes the toughest fastening job a one-man, one-tool job and saves you time and money with every application! Just clip the coupon below for full details.

"If It's Remington—It's Right!"

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REMINGTON STUD DRIVER

MAIL THIS COUPON TODAY!

Industrial Sales Division
Remington Arms Co., Inc., Bridgeport 2, Conn.

Please send me your free booklet which shows where and how to use the cost-saving Remington Stud Driver fastening method.

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Firm__________

Address__________

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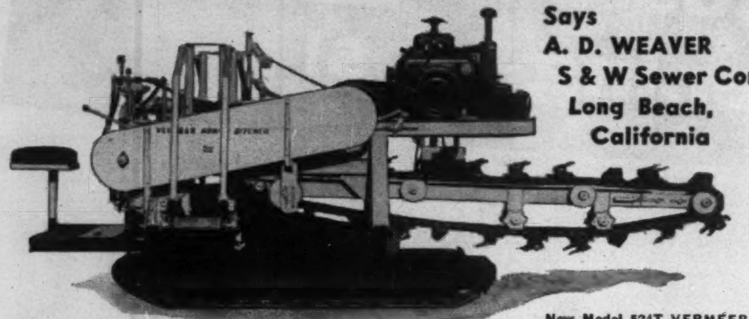
ENR-9

"60% LOWER LABOR COST WITH MY POW-R-DITCHER"

Says
A. D. WEAVER
S & W Sewer Contrs.
Long Beach,
California



New Model 524T VERMÉER
POW-R-DITCHER Above.

BIG DITCHER PERFORMANCE AT LESS THAN HALF COST!

Here's the heavier, stronger, more rugged ditcher that digs for less . . . because it costs so much less! The Vermeer Model 524T POW-R-DITCHER is ideal for contractors, municipalities, utility companies, etc. Digs 8", 10", 14", 18" and 24" wide and down to 6 feet deep. Has 5-speed International Truck Transmission, hydraulically engaged steering controls. This self-propelled, one man operated ditcher is designed to handle wide foundation footings, gas, water and sewage lines at speeds of 1' to 15' per minute. Weighs 5,400 lbs. Get the facts now on this **low priced ditcher** that does the work of more expensive ditchers and trenchers . . . **at a fraction of the cost!** Smaller Vermeer Pow-R-Ditcher models also available. Write for name of distributor and complete details.

Some Excellent Distributor Territories Available

VERMEER MANUFACTURING CO., PELLA, IOWA

IF IT'S A

PLAY SAFE! ASK FOR A DEWATERING ANALYSIS BY

GRIFFIN
WELLPOINT CORP.
881 East 141st Street, New York 54, N. Y.
Hammond, Ind. Houston, Tex. Jacksonville, Fla.

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Eagle pioneered concrete aggregate washing - classifying - dehydrating equipment, Eagle engineers have vast experience. Eagle has more installations than all other makes combined. Eagle has the broadest line. Nationwide factory trained sales-service organization.

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EAGLE IRON WORKS
Screw Washers
Log Washers
"Swintek" Dredge Ladders

Breaker Balls, Pile Hammers, and Line Weights.

(Continued from page 321)

† **Gilford Electrical Contractors,** Front Royal, Va. LB **$117,094.** electrical distr. sys., street lighting sys. ENG-49-080-56-8-(8), ANDREWS AIR FORCE BASE, MD. U. S. Eng., First and Douglas Sts. N. W., Wash. 25, D. C. Bids Sept. 13. CD 8/12.

Zephyr Constr. Co., 7412 New Utrecht Ave., Brooklyn, N. Y., CA, **$744,000.** Contr. HP-102.008, rehabilitation of superstructure of Pier 3, Hoboken Port Authority Piers, HOBOKEN. N. J. The Port of New York Auth., 111 Eighth Ave., New York 11, N Y. Bids Aug. 30, awarded Sept. 15. CD 9/1, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 N. Office Bldg., Harrisburg,

Frank Donatelli & Co., Inc., Broad St. and Euclid Ave., Pittsburgh 6, Pa. CA **$2,779,707.** wid'n. surf. 6.92 mi. 50 ft. width extension of ten existing structures, divided hy. and other imprvs., between Pittsburgh and Export, T. R. U. S. 22, Allegheny Co. CD 8/17, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 N. Office. Bldg., Harrisburg,

Buckley & Co., Inc., 1317-21 S. Juniper St., Phila. 47, Pa. CA **$1,718,453.** constr. 2-span continuous half-through plate girder railroad bridge, alteration and exten. bridge with one simple and two continuous deck girder spans, constr. and maintenance of temporary railroad detour track, disposal of excavated materials and constr. of appurtenant drainage system from Schuylkill Expressway to Arch St., city of Philadelphia, L. R. 67057, Philadelphia Co. CD 8/31, under LB.

MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,

Md.—**Richard F. Kline,** Box 665, Frederick, Md. LB **$333,026.** grading, drainage, relocation 2.049 mi. U.S. Rte. 219 from Penna. Line, Contr. G. 268-1-620, Garrett Co.;

Md.—**McGuire & Rolfe, Inc.,** 1401 First St. S.E., Wash. 3, D. C. LB **$157,469.** surf. 2.53 mi. dual hy. along U.S. Rte. 301, White Plains to Ward Lyons Corner, Contr. CH 257-13-520, Charles Co. Bids Sept. 13. CD 9/7 and 9/8.

Square Constr. Co., 115 S. Haven St., Baltimore, Md. CA **$714,500.** furnishing, installing Canton 48 in. transmission main, BALTIMORE, MD. City, Bureau Water Supply, 503 Municipal Bldg., Baltimore 2, Md. CD 9/13, under LB.

Hoffman & Bishop, 338 E. 25 St., Baltimore 18, Md. LB **$96,000.** 1 story, 23x146x222 ft. brick, steel WAREHOUSE, 1400 block Russell St., BALTIMORE, MD. Andrew Realty Co., Inc., 2025 Worcester St., Baltimore, Md. Fenton & Lichtig, 2219 Maryland Ave., Baltimore 18, Md., archts.

DELAWARE—State Hy. Dpt., Dover,

Del.—**Melvin L. Joseph Constr. Co.,** Georgetown, Del., LB **$81,277.** Contract 1391, Clarksville to Millers Neck. 4.744 mi., Sussex Co.; LB **$78,563.** Contract 1395, County Rd. 277, S-191 (1), Sussex Co.;

Del.—**George & Lynch, Inc.,** Delaware Trust Bldg., Wilmington, Del., LB, **$168,621.** Contract 1385, 0.971 mi. Veale Rd., Kent Co.;

Del.—**James Julian, Inc.,** 405 Du Pont Rd., Elsmere, Del. LB, **$84,175.** c. conc. patching Contract 1426 Sussex Co. Bids Sept. 14. CD 8/29.

BUILDINGS—LB & CA

Cedar Ridge at Bethpage Park Homes, c/o Rudolph A. Matern, archt., 90-04 161 St., Jamaica, N. Y. Owner Builds. **$400,000.** 25 HOUSES on tract on Haypath Rd. east of Plainview Rd., BETHPAGE, N. Y.

▲ **Lawrence D. Elkind,** c/o Stanley J. Shaftel, archts., 166-21 90 Ave., Jamaica, N. Y. Owner Builds. **$13,000,000.** 862 HOUSES, on 340 acre tract on Rutledge and Hancock Sts. between Washington and Grant Aves., BRENTWOOD, N. Y.

Klevens Corp., 3 Federal St., Yonkers 5, N. Y. CA Est. **$375,000.** 2 story LOADING TERMINAL, 11-14 West St., BROOKLYN, N. Y. All States Terminal Corp., 16 Court St., Brooklyn 2, N. Y. CD 4/7.

John W. Cowper Constr. Co., 775 Main St., Buffalo, N. Y. LB **$648,700.** LAUNDRY, Buffalo State Hospital, BUFFALO, N. Y. Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany, N. Y. CD 8/16, under LB.

Chestnut Hill Homes, c/o Stanley Klein, archt., 89-31 161 St., Jamaica, N. Y. Owner Builds. **$350,000.** 25 HOUSES on tract at South Main St. and Carmans Rd., FARMINGDALE, N. Y.

Lancaster at Fresh Meadows, Inc., c/o John Burton & Assoc., archts., 163-18 Jamaica Ave., Jamaica, N. Y. Owner Builds. **$450,000.** 45 HOUSES, 174 St. south of 59 Ave., FLUSHING, N. Y.

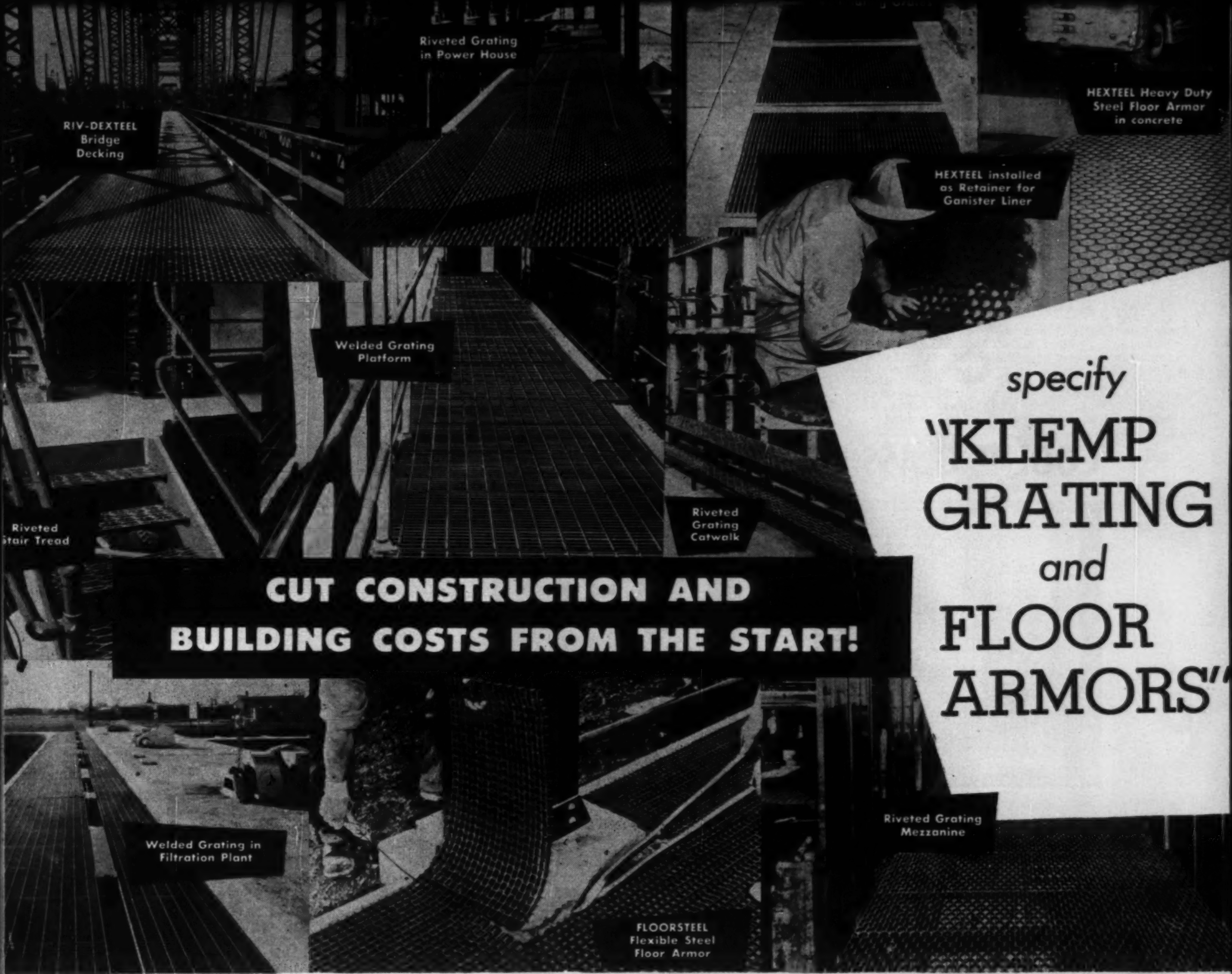
▲ **Milford Estates Homes,** c/o Nassau Homes Sales Agency, 1 N. Merrick Ave., Merrick, N. Y. Owner Builds. **$1,000,000.** 54 HOUSES on 18 acre tract at Dosoris Lane, GLEN COVE, N. Y.

▲ **Hampton Waters Homes,** c/o Nassau Homes Sales Agency, 1 N. Merrick Ave., Merrick, N. Y. Owner Builds. **$5,000,000.** 450 HOUSES, boat basin, STORES, cabanas, tennis courts on 250 acre tract on Oyster Shores Rd., HAMPTON BAYS, N. Y.

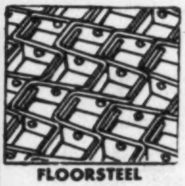
Jackson Heights Corp., c/o A. H. Salkowitz, archt., 87-25 Homelawns St., Jamaica 32, N. Y. Owner Builds. Est. **$495,000.** 45 HOUSES, 78 St. between 29 and 31 Aves., JACKSON HEIGHTS, N. Y.

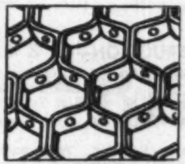
▲ **George A. Fuller Co.,** 597 Madison Ave., New York 22, N. Y. CA Est. **$1,000,000.** OFFICE alterations, NEW YORK, N. Y. Columbia Pictures Corp., 711 Fifth Ave., New York 22, N. Y. CD 6/30.

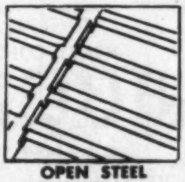
(Continued on page 326)

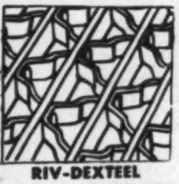

Riveted Grating
in Power House
RIV-DEXTEEL
Bridge
Decking
HEXTEEL Heavy Duty
Steel Floor Armor
in concrete
HEXTEEL installed
as Retainer for
Ganister Liner
Welded Grating
Platform
specify
"KLEMP
GRATING
and
FLOOR
ARMORS"
Riveted
Stair Tread
Riveted
Grating
Catwalk
CUT CONSTRUCTION AND
BUILDING COSTS FROM THE START!
Welded Grating in
Filtration Plant
Riveted Grating
Mezzanine
FLOORSTEEL
Flexible Steel
Floor Armor

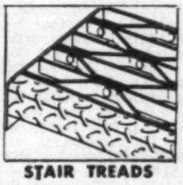
Eliminate Maintenance Costs and Assure Worker Safety with Klemp Products!


FLOORSTEEL


HEXTEEL


OPEN STEEL GRATING


RIV-DEXTEEL (bridge decking)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Phone________________

(Continued from page 324)

Unity Sheet Metal Works, Inc., 167 Christopher St., New York, N. Y. LB $110,000. re-roofing the admin. primate and ostrich bldgs. at New York Zoological Park, Bronx Boro, Contr. X-2-1054, NEW YORK, N. Y. Comr. Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and Fifth Ave., New York 21, N. Y. Bids July 26. CD 7/18.

▲ **Scarsdale Woods Homes,** c/o Rellstab Associates, Inc., 23 Popham Rd., Scarsdale, N. Y. Owner Builds. $1,500,000. 47 HOUSES, on tract near Black Birch Lane, SCARSDALE, N. Y.

Smithtown Greens Homes, c/o Klein & Parker Realty Co., 1391 Northern Blvd., Roslyn, N. Y. Owner Builds. $360,000. 30 HOUSES on tract on Hallock Ave. south of Jericho Turnpike, SMITHTOWN, N. Y.

Old Mill Park Homes, c/o C. J. Kordys, archt., 116 Passaic St., Passaic, N. J. Owner Builds. $360,000. 20 HOUSES on tract at Kings Hy. west of Rte. 303, TAPPAN, N. Y.

Cedar Lane Estates, c/o B. J. Bergton, 55 Cedar Lane, Teaneck, N. J. Owner Builds. $600,000. 30 HOUSES, Cedar Lane, west of Knickerbocker Rd., CLOSTER, N. J.

▲ **The Glenwal Co. Inc.,** State Hy. 46, Saddle River Twp., N. J. CA, $1,129,279. HIGH SCHOOL, FRANKLIN LAKES, N. J. Ramapo Regional High School District, James Heath, pres. School Bldg., Franklin Lakes, N. J. Bids Aug. 16. CD 7/29.

Hillside Estates Homes, c/o Erwin Gerber, 1180 Raymond Blvd., Newark, N. J. Owner Builds. $600,000. 31 HOUSES, Pascock Rd., south of Washington Ave., HILLSDALE, N. J.

Colwill Constr. Co., 2114 Maryland Ave., Baltimore 18, Md. CA $515,375. 1 story, steel, masonry, H-shaped central STORAGE and KITCHEN, Spring Grove State Hospital, CATONSVILLE, MD. State Dpt. P. Imprvts., 506 Park Ave., Baltimore 1, Md. CD 8/10, under LB.

Perryland Corp., 3214 Brooklawn Terrace, Chevy Chase, Md. Owner Builds. $572,000. 52 HOMES, Tilton Dr. and Belvedere Blvd., SILVER SPRING, MD. Jack Cohen, 7961 Eastern Ave., Silver Spring, Md., archt.

D. C. Govt., Dir. Bldgs. & Grounds, 499 Pa. Ave. N. W. Wash., D C,, rejected bids Aug. 16, Shepherd SCHOOL Addn., 14 St. and Kalmia Rd. N. W., WASH., D. C. LB $365,000. CD 8/24, under LB.

SOUTH

HEAVY CONSTRUCTION—BA

† **Tennessee**—BA 10/5—U. S. Eng., P. O. Box 97, Memphis Zone 1, 17,480 lin. ft. channel imprv. and 2,275 lin. ft. new ditch for Running Reelfoot Bayou, Item No. L-841D, Miston, to incl. approx. 686,000 cu. yd. excav., Dyer Co. CIVENG-40-041-56-35.

Va., Norfolk—BA 10/10—Hampton Roads Sanitation District Comn., Bd. of Trade Bldg., combined sewage pumping station and office bldg., incl. connecting gravity, by-pass and force main sewer lines at corner of Plume and Atlantic Sts. Plans deposit $40. Buck, Seifert & Jost, 112 E. 19 St., New York 3, N Y., consult. engrs., adv. ENR 9/29.

† **N. C., Goldsboro**—WING HEADQUARTERS, etc.—BA About 10/17—U. S. Eng., 308 Customhouse, Wilmington, wing headquarters and headquarters, Group Air Base. Seymour Johnson Air Force Base, ENG-31-075-56-20. Plans deposit $8.

† **Louisiana**—BA 10/18—U. S. Eng., P. O. Box 60, Vicksburg, Miss., approx. 688,000 cu. yd. earthwork on west bank of Mississippi River in East Carroll Parish. CD 6/26/46.

† **N. C., Goldsboro**—SEWAGE TREATMENT PLANT—BA About 10/19—U. S. Eng., 308 Customhouse, Wilmington, rehabilitation sewage treatment plant, Seymour Johnson Air Force Base, ENG-31-075-56-16. Plans deposit $5.20.

† **N. C., Fort Bragg**—WAREHOUSE—BA About 10/27—U. S. Eng., 308 Customhouse, Wilmington, bulk storage warehouse, Pope Air Force Base, ENG-31-075-56-12. CD 9/2, under LB.

† **N. C., Goldsboro**—AIRMENS CLUB—BA About 10/28—U. S. Eng., 308 Customhouse, Wilmington, rehabilitation exterior of airmen's club, Seymour Johnson Air Force Base, ENG-31-075-56-26. Plans deposit 80c.

BUILDINGS—BA

Ky., **Louisville**—WAREHOUSE—BA 10/5—General Electric Co., Appliance Park, Louisville, superstructure North warehouse addn., Benchel, $900,000, Albert Kahn Associated Architects & Engineers, Inc., 345 New Center Bldg., Detroit, Mich., archt. Fairbrother & Miehls, 345 New Center Bldg., Detroit, Mich., engrs. CD 5/23/51.

† **N. C., Southport**—FAMILY HOUSING—BA About 10/18—U. S. Eng., 308 Customhouse, Wilmington, family housing, (A) two (1 duplex bldg.) 2,300 sq. ft. colonel's quarters, (B) two (1 duplex bldg., 2,300 sq. ft.) company grade officer units, (C) 1,200 sq. yds. roads, (D) utilities, (E) misc. items, ENG-31-075-56-19. Plans deposit $6.80.

† **Ala., Birmingham**—ARMORY, etc.—BA On Or About 10/25—U. S. Eng., Mobile, Ala., one 2 story approx. 23,500 sq. ft. O. R. C. Armory bldg.; approx. 6,095 sq. ft. motor vehicle storage shed, ENG-01-076-56-21. CD 6/30.

† **S. C., Myrtle Beach**—SECURITY BLDG., etc.—BA About 10/25—U. S. Eng., Customhouse, Charleston, security, control and identification bldg., Myrtle Beach Air Force Base, ENG-38-081-56-4. CD 9/19.

† **La., Lake Charles**—CHAPEL—BA 10/26—U. S. Eng., P. O. Box 1229, Galveston, Tex., educational wing to chapel at Lake Charles Air Force Base, ENG-41-243-56-17, $100,000. CD 8/25.

Ga., **Appling**—SCHOOLS—BA 11/1—State School Bldg. Auth., Kemper Bldg., 41 Exchange Pl. S.E., Atlanta, Harlem Elementary & High School (addns.), Appling Colored Elementary High School, Evans Elementary & High School, Harlem Colored Elementary School, Grovetown Elementary School addn. and mechanical remodeling, Phinizy Elementary School, Appling Elementary School and Evans Elementary School. Plans deposit $50. Kuhlke & Wade, 16 Campbell Bldg., Augusta, archts.

BUILDINGS—SLC

Ky., **Louisville**—LAUNDRY—General Electric Co., Appliance Park, Louisville, soon lets contract 1 story, steel, concrete, brick home laundry, Benchel, $500,000. Hartstern, Louis & Henry, McDowell Bldg., archts. CD 5/23/51.

HEAVY CONSTRUCTION—LB & CA

Middle States Asphalt Corp., Ashland, Ky., LB, $642,696 resurf. 36 streets, HUNTINGTON, W. VA. City, City Hall, Huntington, W. Va. Bids Sept. 10 CD 8/31.

SOUTH CAROLINA—State Hy. Dpt., Hotel Jefferson, Columbia,

S. C.—**Santee Constr. Co., Inc.,** Walterboro, S. C., LB $84,223, (7 bidders) bit. surf. 7.067 mi. Road 44, S. C. Docket No. 8.319. F. A. Proj. No. S-754 (1), Berkeley Co.;

S. C.—**Peden Constr. Co. Inc.,** 52 Mayberry St., Greenville, S. C., LB $413,872 (7 bidders), bit. surf. 5.157 mi. US Rte. 29, S. C. Dockets Nos. 23.371 and 23.372, F. A. Proj. Nos. F-FG-2600 (3), F-2600 (1), Part 1 and F-FG-2600 (4), Greenville Co.;

S. C.—**Sharp Constr. Co. Inc.,** Turbeville, S. C., LB $78,523, (4 bidders) bit. surf. 6.598 mi. Roads 131, 193, 218 thru 225, 228 thru 231, 2341, 235 and 128, S. C. Dockets Nos. 26.336 and 26.338. F. A. Proj. No. F-924 (1), Horry Co.;

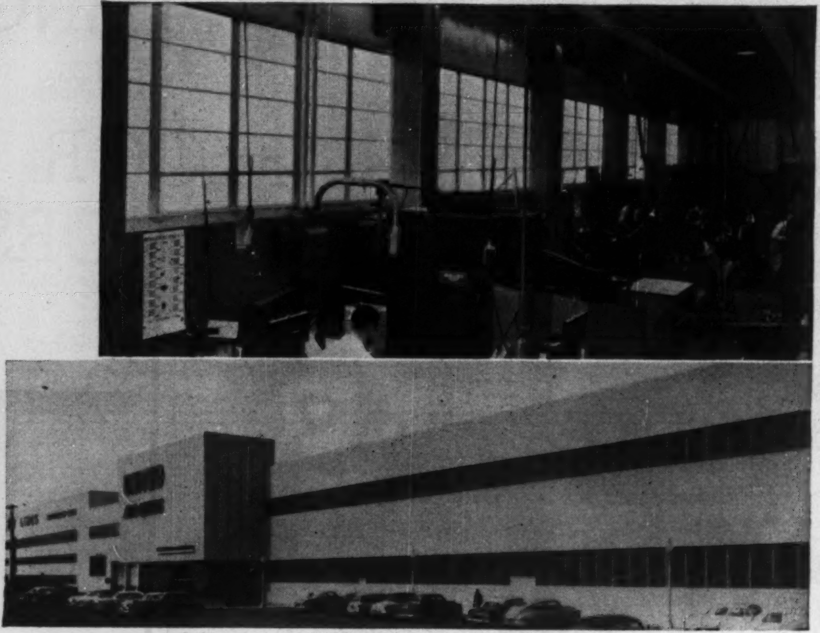
S. C.—**W. M. Reagan & Sons, Inc.,** Sumter Hy., Columbia, S. C., LB $100,518 (7 bidders) bit. surf. 9.233 mi. Roads 57, 56 and 13, S. C. Docket No. 28.334, F. A. Proj. No. S-184 (2), Kershaw Co. Bids Sept. 13. CD 9/6.

† **Clemens Constr. Co.,** West Palm Beach, Fla., LB, $904,300. Levee 6, Central & Southern Florida Flood Control Proj., CIVENG-08-123-56-6, Broward and Palm Beach Counties, FLORIDA U. S. Eng., P. O. Box 4970 Jacksonville, Fla. Bids Sept. 7. CD 8/2.

▲† **Port Constr. Co.,** 3664 Old St. Augustine Rd., Jacksonville, Fla., CA $1,114,499. storage facilities, ordnance area, Homestead Air Force Base, ENG-08-123-56-12, HOMESTEAD, FLA. U. S. Eng., P. O. Box 497, Jacksonville, Fla. Bids Aug. 23. 8/30, under LB.

(Continued on page 329)

COOLITE GLASS HELPS KEEP 'EM FLYING



Building design by J. H. Brunnier, Engineers; General Contractor, Barrett & Hilp; Glass and Glazing, Habenicht & Howlett

Better Daylighting Brightens United Airlines Maintenance and Engineering Building

Excellent maintenance and engineering stand behind the enviable operating record of United Airlines and this outstanding new structure has been especially designed to help protect that record. Highly trained engineers and technicians will work more efficiently in these quarters, copiously flooded with diffused daylight by Luxlite Coolite, on which our glare reducing finish has been applied. No harsh shadows, no distracting glare, no uneven illumination will annoy skilled employees at vital tasks. In addition, Coolite also absorbs much of the unwanted solar heat . . . helps keep interiors comfortable.

Coolite, Heat Absorbing, Glare Reducing Glass enables workers to see better, feel better, work better. A refreshing and practical pattern assuring adequate obscurity, it is easy to clean. And its deep, blue color enchances exteriors, particularly befits modern design. This efficiency-boosting Mississippi Glass minimizes need for unsightly painted windows, makeshift blinds.

Consider Coolite in your new building and remodeling assignments. Translucent, light diffusing glass by Mississippi is manufactured in a wide variety of patterns and surface finishes "visioneered" for better daylighting. See nearby distributor of quality glass.

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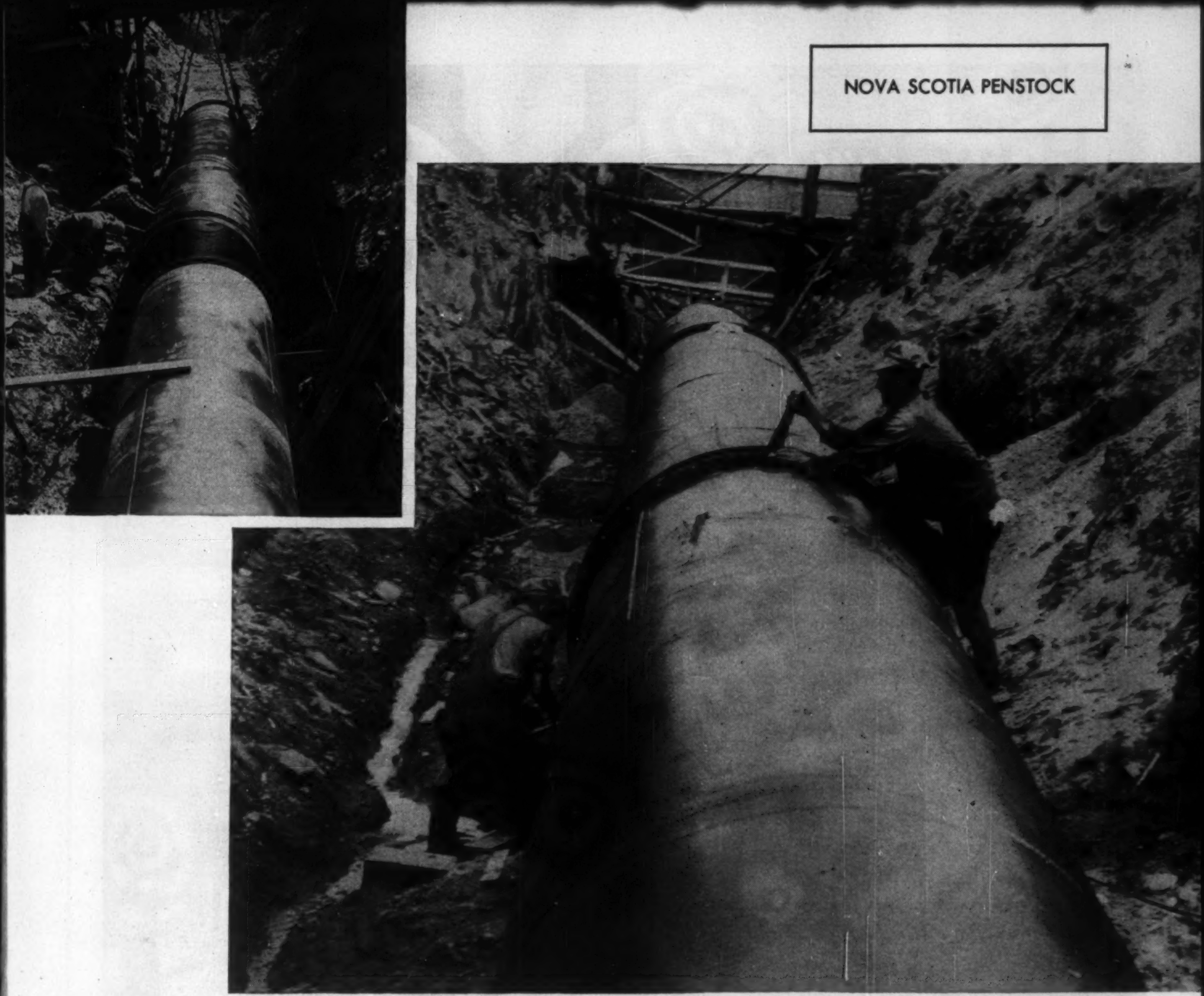
NOVA SCOTIA PENSTOCK



Engineered and installed by the Nova Scotia Power and Light Company, Ltd., this 66" line was covered from 4' to 17' deep. Pipe was made by Halifax Ship Yard; pipe and couplings were bituminous coated. Wall thicknesses range from ⅜", ½", 9/16" to ⅝" for line pressures of up to 195 psi.

BIG JOB, SMALL WRENCH

From a reservoir served by the Nictaux River, 100 miles southwest of Halifax, water now flows via canal and wood stave pipe to this 3312' Dresser-Coupled steel penstock.

The lighter weight, high-strength steel pipe was delivered to the job with Dresser Coupling middle rings and followers already in place. It was a simple matter to swing the long pipe lengths into the ditch. Then workmen put in the bolts and tightened the end nuts. *A wrench was the only joining tool required.*

That's how it is on all Dresser-Coupled jobs. No expensive skills or equipment are needed. Work can proceed in any weather at an average of only two man-minutes per bolt. And there's no need for exact pipe fitting or alignment. The resilient rubber gasket in every Dresser Coupling absorbs line stresses, strains and movement . . . permits expansion and contraction . . . keeps joints bottle-tight and trouble-free for life!

***BEFORE YOUR NEXT PENSTOCK PROJECT,* write for helpful, interesting engineering data on the many successful and varied Dresser-Coupled, steel-pipe penstock installations.**

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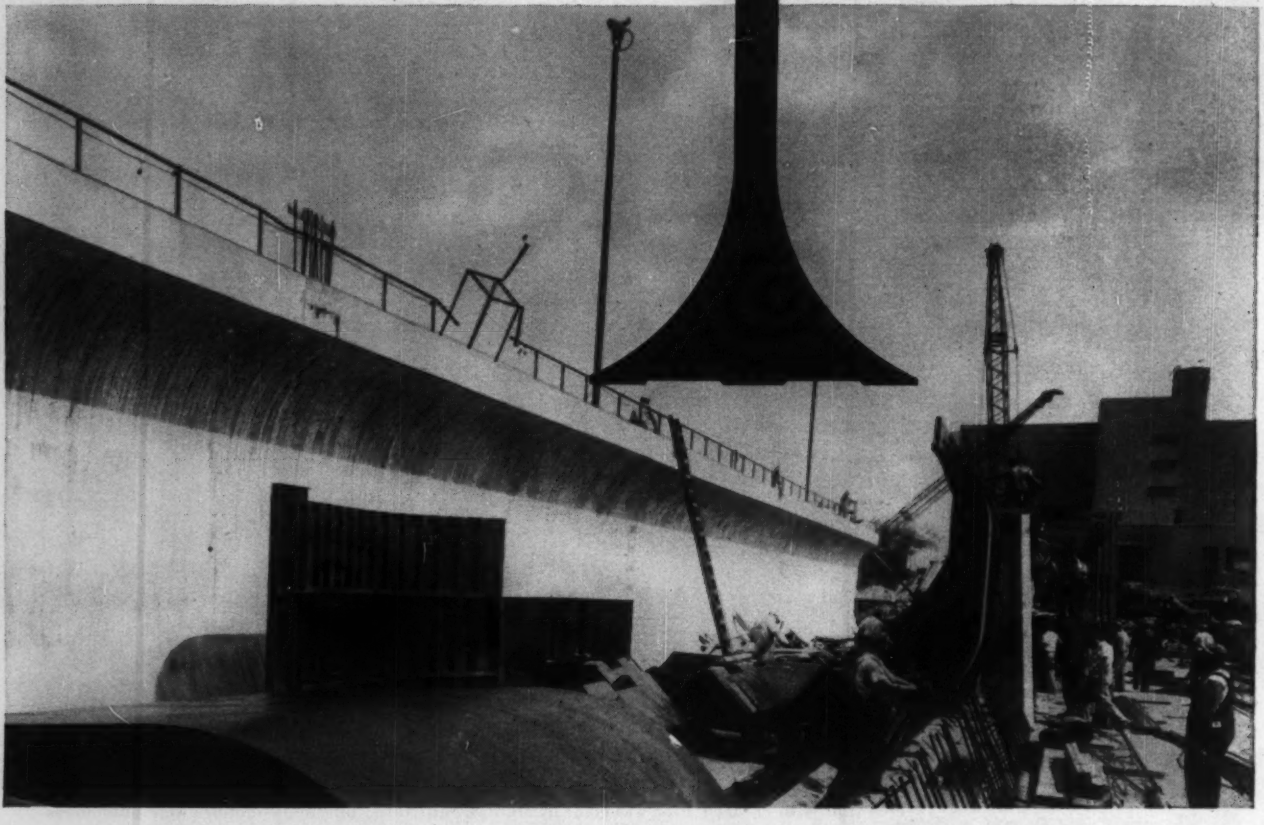
How to Pour a Y Shaped Wall Without Trouble



Contractor: J. Rich Steers, Inc., New York. Job: Bowery Bay Sewage Plant Expansion, New York City

Over 5,000 feet is a lot of wall. Particularly when it's 20′ high . . . and especially when it has a flared base and considerable overhang. Labor and material costs could run very high on a job like this.

But when J. Rich Steers, Inc., took the contract for the two new aeration tanks at the Bowery Bay Sewage Treatment Plant, they knew how it should be handled. They called on Irvington engineers to build a set of forms that would keep costs down.

The forms, made in 3′ sections for easy shipment, are quickly assembled into mulitple sections on the job. These multiple sections go together without complications to permit pours averaging about 70′ each. A simple but ingenious tie system makes bracing unnecessary. Trouble-free, accurate forming is dependably certain. **Finishing costs: negligible.**

If you are figuring on any job where repeated-use forms are indicated, it will cost you nothing, and may pay you greatly, to talk over ways and means with Irvington engineers. A letter, wire or phone call will put their experience and know-how at your service.

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(Continued from page 326)

M. R. Vaughn, Limona St., Tampa, Fla., LB **$150,298,** pumping stations and ejector stations, Div. XG17, XG21, XG23, XG26, TAMPA, FLA. Bd. Representatives, City Hall, Tampa, Fla. Bids Sept. 15. CD 8/22;
received no bids on Sept. 15, Div. XG28, Neptune Bay ejector station with one 250 g.p.m. capacity pneumatic sewage ejector (Tampa, Fla.).

† **Moss Constr. Co.,** 822 12 St., Columbus, Ga., LB **$933,547,** non-overflow earth dike at Fort Gaines Lock and Dam, Chattahoochee River, CIVENG-01-976-56-1, ALABAMA and GEORGIA. U. S. Eng., Grant St., Mobile, Ala. Bids Sept. 13. CD 8/17.

Clarke Stewart & Wood, 328 Georgetown St., Lexington, Ky. LB **$213,000.** swimming pool, FRANKFORT, Ky. City, 307 W. Main St., Frankfort, Ky. Bids Sept. 12. CD 8/24.

† **T. E. Akers & Co.,** 1213 Division St., Nashville, Tenn., CA **$553,887,** air force facility buildings and utilities, IFB ENG-40-058-56-1, JOELTON, TENN. U. S. Eng., 306 Federal Office Bldg., Nashville, Tenn. Bids About Aug. 16. CD 7/21.

† **Empire Gas Engr. Co.,** 7 Baltimore Pl. N. W. Atlanta, Ga., CA **$233,833,** conversion of heating facilities to natural gas, Contr. No. AF 40(602)-359, IFB 40-602-55-51, Stewart Air Force Base, SMYRNA, TENN. Purchasing & Contracting Office, Sewart Air Force Base, Smyrna, Tenn.

BUILDINGS—LB & CA

▲ **Murphy Pound Constr. Co.,** 1208 Midway Dr., Columbus , Ga., CA, **$3,000,000.** SHOPPING CENTER, COLUMBUS, GA. B. Thorpe & Co., 951 Pennsylvania Ave., Pittsburgh, Pa. Awarded Sept. 9.

Louis Briggs Constr. Co., Box 570, Macon, Ga., LB, **$965,259.** Jeffersonville Vocational SCHOOL; Jeffersonville ELEMENTARY & HIGH SCHOOL; Mount Olive Elementary SCHOOL; Smith Elementary SCHOOL; Antioch Elementary SCHOOL, JEFFERSONVILLE, GA. State School Bldg. Auth., 41 Exchange Pl. S.E., Atlanta, Ga. Bids Sept. 13. CD 8/16.

† **Malan Constr. Co.,** 25-09 42 St. Rd., Long Island City 1, N. Y. CA **$978,000.** process constr. BLDG. C-420, Inv. 58, PADUCAH, KY. Atomic Energy Comn., 1901 Constitution Ave. N.W., Wash., D. C. Bids Aug. 5, awarded Aug 18. CD 8/12, under LB.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

Ill., Menard—HEATING SYSTEM—BA 10/4—State Div. Architecture & Eng., Armory-Office Bldg., Springfield, heating work, pipe covering work, repairs to heating sys., Hospital Bldg., Illinois State Penitentiary, Menard Branch. CD 2/27/45, under Public Buildings.

Ill., St. Charles—BA 10/4—State Div. Architecture & Eng., Armory-Office Bldg., Springfield, water main exten. for fire protection; turbine well pump, pump house and piping, electrical work for pump, pumphouse and services for Well No. 3, Illinois State Training School for Boys.

O., Akron—BA 10/4—City, Dpt. P. Service, Leo G. Walter, supt., Municipal Bldg., sanitary sewer in Chandler Ave. from Mud Run to 24 St. S.W.; 24 St. from Chandler to Battles Ave.; Battles Ave. from 24 to 13 St. $128,618. Beiswenger & Hoch, 661 W. Market St., engrs. CD 11/6/53.

† **O., Dayton** — CELL MODIFICATIONS — BA 10/4 — U. S. Eng., P.O. Box 59, Louisville 1, Ky., modifications in Cells A, B and C Bldg. 71-A, Wright-Patterson Air Force Base. $500,000. CD 6/22, under LB.

† **Wis., Milwaukee** — WAREHOUSE — BA 10/5 — U. S. Eng., 475 Merchandise Mart, Chicago 54, Ill., warehouse, General Mitchell Field, Milwaukee, Serial No. ENG-11-032-56-5. Extended date. CD 9/2.

Ind., Mount Vernon—BA 10/10—City, Paul Hironimus, mayor, (A) sanitary sewer extens., incl. 51,650 lin. ft. 8- to 24-in. sewers; 220 manholes and appurtenant work (B) sewage treatment plant and sewage pumping station. Plans deposit $30. Paul J. Kleiser & Assocs., 671 Tippecanoe St., Terre Haute, engrs. CD 4/6.

† **Illinois**—BA 10/20—U. S. Eng., 420 Locust St., St. Louis 2, Mo., abatis dikes across existing levee borrow pits, East Cape Girardeau and Clear Creek Drainage Dist., Proj. Item IV-A (2) Alexanders Co., CIVENG-23-065-56-15.

BUILDINGS—BA

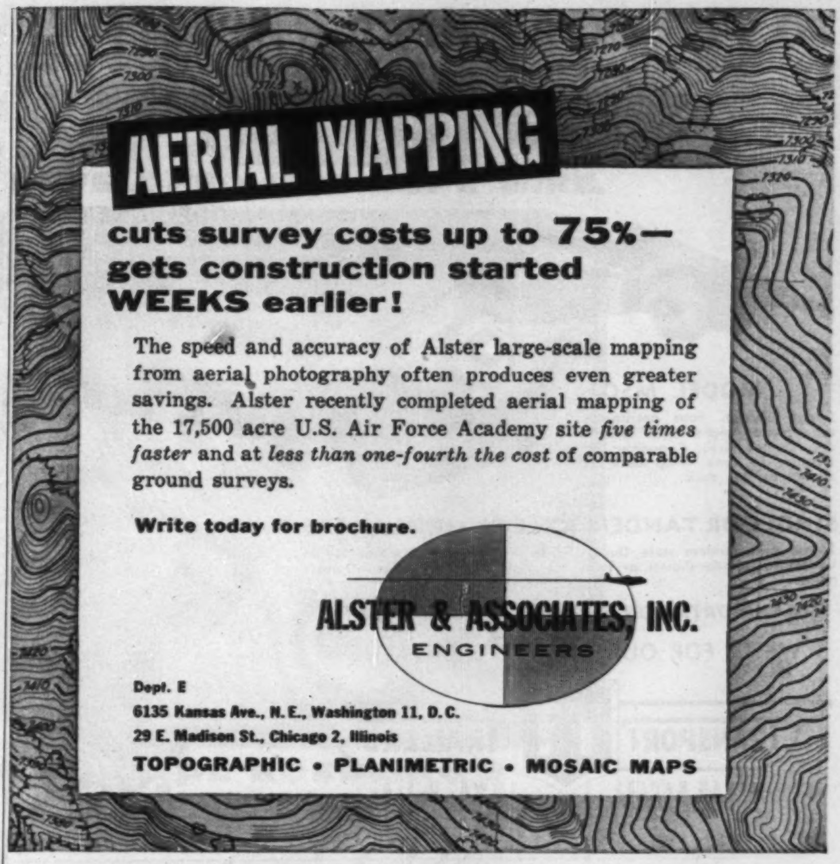
▲ **Ill., Joliet**—SCHOOL—BA 10/5—School District 86, 153 S. Ottawa St., West Side High School. $1,500,000. Childs & Smith, 20 N. Wacker Dr., Chicago, Zone 6, archts. CD 12/23.

Mich., Monroe—SCHOOL—BA 10/6—Bd. Educ., Jefferson Consolidated School Dist., constr. Jefferson Consolidated School addn. Jensen & Keough, 15875 James Couzens Hy., Detroit, archts. CD 1/2/53.

O., Crestline — HOSPITAL — BA 10/8 — Bd. Trustees Crestline Memorial Hospital, Crestline, 1 story, bsmnt. hospital. $350,000. Loren J. Staker, 484 Berkely St., Columbus, archt. CD 10/21.

Mich., Frankenmuth—SCHOOL—BA 10/11—Frankenmuth Twp. Bd. Educ., A. C. Nuechterlein, secy., constr. Frankenmuth Town School addn. Plans deposit $25, refundable. Frederick E. Wigen, 507 Wiechmann Bldg., Saginaw, archt.

O., Parma—SCHOOL—BA 10/14—Bd. Educ., Carl G. Byers, supt., 5401 W. 54 St., Zone 29, Pleasant Valley Junior High School addns. $450,000. Plans deposit $25 general, $20 heating, vent. and plumbing;



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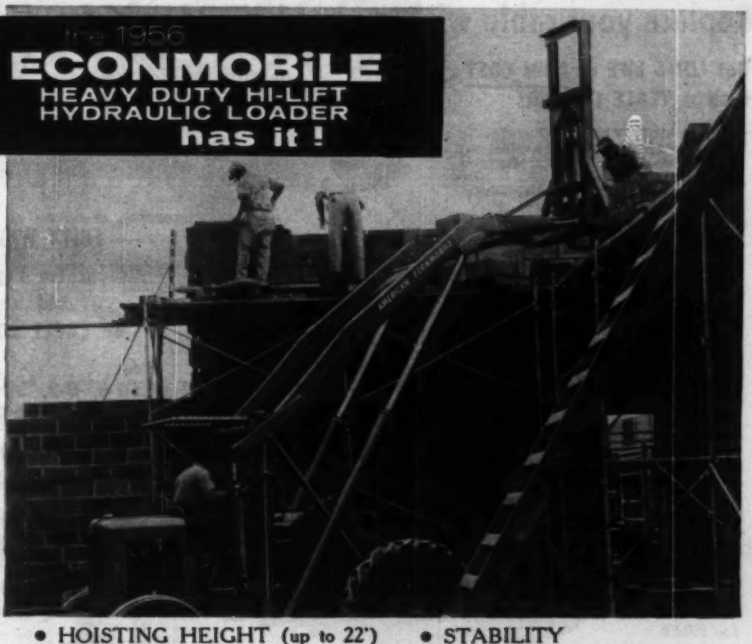

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$20 electrical, $15 furnishings and equip., $15 kitchen equip. Fulton, Krinsky & DelaMotte, 6014 Euclid Ave., Cleveland, Zone 3, archts. CD 8/4.

O., Toledo—SCHOOL—BA 10/14—Bd. Educ., Wm. E. Hallauer, asst. supt., Linwood and Southard Sts., DeVeaux School addn., Sylvania Ave. and Maxwell Rd. $433,103. Plans deposit $15. Britsch & Munger, National Bank Bldg., archts. CD 11/19.

O., Massillon—SCHOOL—BA 10/19—Bd. Educ., Massillon, Franklin School. $725,000. Dalton & Dalton, Old Arcade, Cleveland, Zone 14, archts. CD 9/16.

O., Wilmington—SCHOOL—BA 10/24—Bd. Educ., Simon Kenton Local School Dist., new high school, altering present high and elementary schools, $350,000. Plans deposit $25. Sullivan-Isaacs-Sullivan & Assoc., 1800 Reading Rd., Cincinnati, engrs.-archts. CD 11/10.

BUILDINGS—SLC

▲ **Ill., Chicago** — OFFICE — Salvation Army, 719 S. State St., Zone 10, soon lets contract office, 866 N. Dearborn Parkway. $1,250,000. Skidberg & Olsen, 2532 Milwaukee Ave., archts. CD 9/15.

HEAVY CONSTRUCTION—LB & CA

White Constr. Co., 1313 Circle Square, Forest Park, Ill., LB, **$128,181** (4 bidders) resurf. East and West Grand Ave., CHICAGO, ILL. City, City Hall, Chicago, Ill. CD 1/28.

Robert A. Black, Inc., 13912 S. Halsted St., Riverdale, Ill., LB, **$92,000.** bit. surf. Golfview Rd., NORTHLAKE, ILL. Village, Village Hall, Northlake, Ill. Consoer Townsend, 351 E. Ohio St., Chicago, Zone 11, engr. Awarded Sept. 8.

Werner Co., 9713 Harding Blvd., Wauwatosa, Wis., CA, **$75,003.** (12 bidders) sewers in S. Honey Creek Dr., MILWAUKEE, WIS. City, City Hall, Milwaukee, Wis. Bids Sept. 12, awarded Sept. 13.

BUILDINGS—LB & CA

Mayer-Hecht Co., 2824 Stanton Ave., Cincinnati, O. LB **$113,800.** BOILER HOUSE, equip. MAINTENANCE SHOP, 2710 Reading Rd., CINCINNATI, O. Bethesda Hospital, Reading Rd., Cincinnati, O. CD 8/17.

▲ **Swango & Sons Constr. Co.**, 258 E. Stroop St., Dayton, O. Owner Builds. **$12,000,000.** 600 brick HOMES, east of Wilmington Pike and south of Swigert Rd. on 200 acre site known as "Rolandia Acres", KETTERING, O.

Clifford C. Loss, 3656 Alexis Rd., Toledo, O. Owner Builds. **$350,000.** 34 HOMES on Harvest Lane between Meteor and Buchanan in Washington Twp., TOLEDO, O.

Don Shine Realty Co., 5560 Madison Ave., Indianapolis, Ind. Owner Builds. **$400,000** or more. HOUSES, on south side, INDIANAPOLIS, IND.

Atlantic Constr. Corp., 4221 N. Ritter Ave., Indianapolis, Ind. Owner Builds. **$500,000.** HOUSING, on east side, INDIANAPOLIS, IND.

▲ **F. A. Wilhelm**, 3914 Prospect St., Indianapolis, Ind., CA, **$1,200,000**, general contract 3 story OFFICE BLDG., 2020 N. Meridian St., INDIANAPOLIS, IND. Citizens Gas & Coke Utility, Maryland and Pennsylvania Sts., Indianapolis, Ind. CD 1/19.

Circle Drive Estates, Mooresville, Ind. Owner Builds. **$400,000.** HOMES in Circle Drive Estates, MOORESVILLE, IND.

▲ **Citation Builders**, 7728 N. Sheridan St., Chicago, Ill. Own Forces. **$8,375,000.** 375 HOMES, BARRINGTON, ILL.

▲ **Citation Builders**, 7728 N. Sheridan St., Chicago, Ill. Own Forces. **$3,750,000.** 150 HOMES, near CHICAGO, ILL.

Fred Berglund & Son, 8410 S. South Chicago Ave., Chicago, Ill., CA, **$200,000.** 20,000 sq. ft. chemical PLANT, CHICAGO, ILL. Sherwin Williams Co., 115 and Cottage Grove Ave., Chicago, Ill. Schmidt, Garden & Erikson, 104 S. Michigan St., Chicago, Ill., archts. Awarded Sept. 12. CD 12/17.

Worsham Midwest Corp., 3557 W. Peterson St., Chicago, Ill., CA **$700,000** and **Wagner Iron Works**, 1905 S. 1 St., Milwaukee, Wis., CA **$250,000.** PLANT addns., WAREHOUSE, SILOS and OFFICE, KANKAKEE, ILL. A. O. Smith Corp., 3533 North 27 St., Milwaukee, Wis.

▲ **Citation Builders**, 7728 N. Sheridan St., Chicago, Ill. Own Forces. **$1,250,000.** 50 HOMES, MORTON GROVE, ILL.

▲ **Schavilje & Knoth**, 5668 N. Olcutt St., Chicago, Ill. Own Forces. **$3,600,000.** 130 HOMES, area of MOUNT PROSPECT, ILL.

▲ **Citation Builders**, 7728 N. Sheridan St., Chicago, Ill. Own Forces. **$5,375,000.** 215 HOMES, NILES, ILL.

▲ **Citation Builders**, 7728 N. Sheridan St., Chicago, Ill. Own Forces. **$1,250,000.** 50 HOMES, NORTHBROOK, ILL.

▲ **Citation Builders**, 7728 N. Sheridan St., Chicago, Ill. Own Forces. **$1,250,000.** 50 HOMES, NORTHFIELD, ILL.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

† **Arkansas**—BA 10/5—U. S. Eng., P. O. Box 97, Memphis 1, Tenn., levee construction, incl. riverside enlargement and roadway embankment Levee Item No. WR-L-58, above Lambrook, Levee Stations 14/50-18/40, in White River Drainage District of Phillips and Desha Counties, CIVENG-40-041-56-36.

† **Wyoming**—BA 10/11—Bureau Reclamation, Reclamation Center, Casper, compacted earth lining for Casper Canal, Station 1164 plus 00 to Station 1194 plus 00,

(Continued on page 333)

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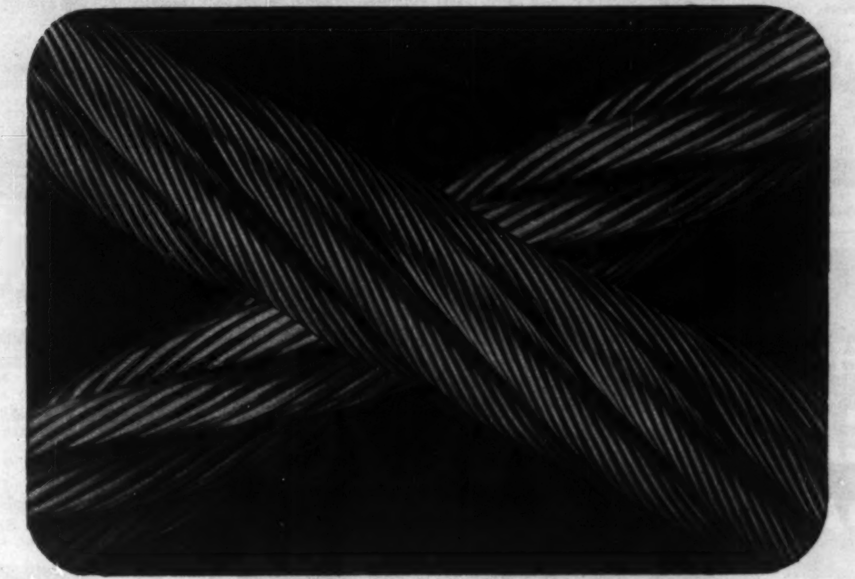

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(Continued from page 330)

Station 2038 plus 00 to Station 2043 plus 00 and Station 2073 plus 50 to Station 2087 plus 00 Kendrick Proj., Spec. 703C-384; adv. ENR 9/29. CD 9/12/44.

† **Arkansas**—BS 10/13—U. S. Eng., P. O. Box 60, Vicksburg, Miss., approx. 637,000 cu. yd. earthwork on north bank of Arkansas River in Jefferson Co.

† **Tex., Fort Worth**—AIRCOMNET BLDG.—BA 10/18—U. S. Eng., 100 W. Vickery Bldg., aircomnet bldg., Carswell Air Force Base, ENG-41-443-56-2. Tatum & Quade, 2812 Fairmount St., Dallas, archts. CD 6/18/52.

† **Wyoming**—BA 11/1—Bureau Reclamation, Dpt. Interior, Rock Springs, earthwork, structures, for Eden laterals, sublaterals, drains and wasteways, Eden Proj., near Eden, Spec. DC-4479; adv. ENR 9/29.

BUILDINGS—BA

Neb., Omaha—POWER PLANT PIPING—BA 10/27—Omaha Public Power Dist., 17 and Harney Sts., piping sys., etc. for Unit 2, North Omaha Power Plant. $100,000. Pioneer Service & Eng. Co., 231 S. LaSalle St., Chicago, Ill., engr. A. G. Johnson, c/o owner, ch. engr. CD 8/17/51.

Martin Eng. Co., Pelican Rapids, Minn., LB **$489,414.** (4 bidders) 749 mi. rural telephone lines in Stevens, Swift, Big Stone, Pope and Traverse Counties, MINNESOTA. Federated Telephone Co-operative, Chokio, Minn. Bids Sept. 13. CD 8/22.

City, H. Erickson, city engr., City Hall, Minneapolis, Minn. Owner Builds. **$75,000.** furnish, install new type fluorescent lighting in Hennepin Ave. between Washington Ave. and 12 St., MINNEAPOLIS, MINN.

Underground Constructors, Dodge Center, Minn. CA **$300,000.** lay 15 mi. 6 in. pipe line from Pine Bend, to owner's terminal in west St. Paul, ST. PAUL, MINN. Socony Mobil Oil Co., 852 Hathaway St., St. Paul, Minn.

† **Bushman Constr. Co.**, Box 107, St. Joseph, Mo. LB **$959,182**, est. $859,664. earthwork and structures Kirwin Main Canal, Spec. DC-4488, KANSAS. Bureau Reclamation, Dpt. Interior, Kirwin, Kan. Bids Sept. 15. CD 7/27.

KANSAS—State Hy. Comn., Masonic Temple, Topeka,
Ira Van Buskirk & Sons, Hawarden, Iowa. CA **$234,845.** grading 8.733 mi., Proj. 75-7 F 063-4 (5), Brown Co. Bids Sept. 8. CD 8/25.

OKLAHOMA—State Hy. Dpt., Oklahoma City, Zone 5,
Park Ward Co., Commerce Exchange Bldg., Oklahoma City, Okla., CA **$539,002**, est. $543,213, grade 7.926 mi. and b. conc. paving Hy. 76, Garvin Co. Bids 9/13, awarded 9/15. CD 9/19, under LB.

OKLAHOMA—State Hy. Dpt., Capitol, Oklahoma City, Zone 5,
rejected bids Sept. 13, reflooring Arkansas River Bridge near Haskell, Muskogee Co. LB **$77,059.** CD 9/19, under LB.

OKLAHOMA—State Hy. Dpt., Capitol, Oaklahoma City, Zone 5,
Okla.—**Lyles & Buckner**, Box 23, Muskogee, Okla., LB **$151,156**, est. $156,555, (7 bidders) concrete, steel bridge over Illinois River on county road, Chewey, Adair Co. Bids Sept. 13. CD 9/1.

OKLAHOMA—State Hy. Dpt., Capitol, Oklahoma City, Zone 5,
Okla.—**Broce Constr. Co.**, Woodward, Okla., LB **$126,295**, est. $126,766, (5 bidders), soil cement base, double bit. surf. 4.662 mi. county road at Henryetta, Okmulgee Co.; LB **$78,972**, est. $78,547, (4 bidders) soil cement base, double bit. surf. 4.044 mi. country-road at Morris, Okmulgee Co.;
Okla.—**Clark Constr. Co.**, Woodward, Okla., LB **$81,873.** est. $89,011 (5 bidders) stabil. asph. base, double bit. surf. 5.578 mi. county road at Arnett, Ellis Co.;
Okla.—**Poston Constr. Co.**, Lawton, Okla., LB **$72,700.** est. $77,272 (6 bidders), stabil. asph. base, double bit surf. tr. county road 6.04 mi. at Altus, Jackson Co. Bids Sept. 13. CD 9/1.

▲ **TEXAS**—State Hy. Comn., Austin,
Tex.—**R. C. Buckner**, P. O. Box 609, Jacksonville, Tex. LB **$84,389**, 0.726 mi. structures, Hy. SH 259 and FM 13, Proj. S 1512 (2), etc., Rusk Co.;
Tex.—**Heidenfels Bros.**, P. O. Box 1917, Corpus Christi, Tex. LB **$165,514**, 0.5 mi. widen seven large drainage structures and approaches, Hy. US 281, Proj. F 798 (2), Live Oaks Co.;
Tex.—**Kidwell & Rogers Constr. Co. and McElwrath Bros.**, 4515 Prentico St., Dallas, Tex., LB **$170,889**, widen bridges and approaches 2.989 mi. Hy. US 87, Proj. F 631 (10), Gillespie Co.;
Tex.—**Whittle Constr. Co.**, P. O. Box 5602, Dallas, Tex. LB **$1,269,268**, Pecos River bridge and approach 1.373 mi. Hy. US 90, Proj. ER-14 (1), Val Verde Co. Bids Sept. 14. CD 8/4, 8/19, 8/29, 9/2.

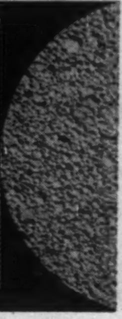
▲ **TEXAS**—State Hy. Comn., Austin,
Tex.—**W. L. Barnes, Contr.**, 3102 Perry Lane, Austin, Tex. LB **$270,221**, fdn. course, flexible base, one course surf. tr., b. conc. 8.245 mi. Hy. US 181, Proj. F 266 (4), Karnes Co.;
Tex.—**B. G. Brown & Co., J. A. Pruit and T. M. Brown & Sons, Inc.**, P.O. Box 1919, Abilene, Tex., LB **$913,547**, flexible base, b. conc. pavement and T. & P. R.R. overpass 9.397 mi. Hy. US 80, Proj. FI 7 (5), etc., Mitchell Co.;
Tex.—**E. B. Darby & Co., Inc.**, P.O. Box 467, Pharr, Tex. LB **$152,788**, grading, structures, base, surf. 12.787 mi. Hy. LM 606, etc., Proj. S 604 (3), etc., Willacy Co.;
Tex.—**J. R. Fanning**, P.O. Box 1278, Lubbock, Tex., LB **$775,483**, flexible base, b. conc. 10.051 mi. Hy. US 66, Proj. C 275-5, etc., Gray and Donley Counties;
Tex.—**Gulf Bitulithic Co.**, P.O. Box 2572, Houston, Tex. LB **$119,632**, grading, structures, base, surf. 6.107 mi. Hy. FM 1693, Proj. S 2072 (1), Colorado Co.;
Tex.—**E. W. Hable & Sons**, Corsicana, Tex., LB **$88,577**, grading, structures, base, surf. 3.317 mi. Hy. FM 246, Proj. S 374 (8), Navarro Co.;
Tex., **Harrison Eng. & Constr. Corp.**, 3706 Broadway, Kansas City, Mo., LB **$283,545**, grading, structures, pavement wid'n. 1.519 mi. Hy. US 69, Proj. F 53 (18), Jefferson Co.;
Tex.—**Allen Keller Co.**, P.O. Box 393, Fredericksburg, Tex., LB **$83,599**, flexible base, two course surf. tr. 0.874 mi. Hy. US 281, Proj. F 723 (1), Burnet Co.;
Tex.—**L. H. Lacy Co.**, 563 Yale Blvd., Dallas, Tex., LB **$884,631**, c. conc. 3.738 mi. Hy. US 75, Proj. F 539 (15), etc., Grayson Co.;
Tex.—**John T. Leslie**, Bailey, Tex., LB **$230,817**, flexible base, two course surf. tr. 3.545 mi. Hy. SH 158, Proj. S 691 (3), Sterling Co.;
Tex.—**Luce Constr. Co. & C. C. Booth**, P.O. Box 1799, Vernon, Tex., LB **$556,065**, flexible base, two course surf. tr. 14.843 mi. Hy. US 67 and 377, Proj. F 580 (11), etc., Comanche Co.;
Tex.—**Ernest L. Mays**, 3430 Minglewood Dr., Beaumont, Tex. LB **$116,159**, grading, structures, base, surf. 6.218 mi. Hy. FM 562 and 1985, Proj. R 1022-1-7, etc., Chambers Co.;
Tex.—**Hugh McMillan**, P.O. Box 1227, El Paso, Tex., LB **$108,027**, grading, structures, base, surf. 9.164 mi. Hy. FM 1437, Proj. S 2059 (1), etc., Hudspeth Co.;
Tex.—**Moore Bros. Constr. Co.**, Lufkin, Tex., LB **$86,076**, grading, structures, base, surf. 5.45 mi. Hy. FM 2259, Proj. S 2016 (1), Nacogdoches Co.;
Tex.—**Dan Pennington**, Grapeland, Tex., LB **$153,418**, grading, structures, base, surf. 8.852 mi. Hy. FM 542, Proj. V 426-3-3, Leon Co.;
Tex.—**Reynolds & Huff**, P.O. Box 88, Tyler, Tex., LB **$114,767**, grading, structures, base, surf. 6.191 mi. Hy. FM 2254, Proj. S 2067 (1), Camp Co. Bids Sept. 13. CD 9/2, 8/19, 8/29.

TEXAS—State Hy. Comn., Austin,
Tex.—**R. C. Buckner**, P. O. Box 609, Jacksonville, Tex. LB **$110,219**, bridge and approach 0.792 mi. Hy. FM 521, Proj. C 846-3-2, Matagorda Co.;
Tex.—**Norman L. Larson & Dean Skinner, Contr.**, P. O. Box 5216, Austin, Tex., LB **$285,782**, widen bridges and approaches 2.477 mi. Hy. US 77 and 77A, Proj. F 373 (5), etc., Lavaca Co. Bids Sept. 13. CD 8/29, 9/2.

▲ **TEXAS**—State Hy. Comn., Austin,
Tex.—**W. R. Aldrich & Co.**, P. O. Box 1751, Baton Rouge, La., LB, **$1,233,821**, grading, structures 6.946 mi. Hy. SH 73, Proj. IN 1052 (28) Chambers Co.;
Tex.—**R. C. Buckner**, P. O. Box 609, Jacksonville, Tex., LB **$112,690**, grading, structures, base, surf. 5.065 mi. Hy. FM 144, Proj. S 576 (3), Morris Co.;
Tex.—**Collins Constr. Co. of Texas**, P. O. Box 1192, Austin, Tex., LB **$189,657**, flexible base, b. conc. 2.574 mi. Hy. SH 349 and 158, Proj. C 380-9-12,

(Continued on page 334)

FACTS YOU SHOULD KNOW ABOUT
MEARLCRETE®
FOAM CONCRETE



1 **WHAT IS MEARLCRETE FOAM CONCRETE?** It is cellular concrete made up of individual air cells. The tough, preformed foam, made with Mearlcrete Foam Liquid, is blended into the ordinary cement slurry, with or without aggregates, to make a foam concrete in any desired density, from 20 to 120 pounds per cubic foot.

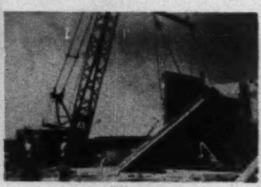
2 **DENSITY IS CONTROLLED WITH PRECISION.** Normal variations in temperature, water hardness, and other factors which affect chemical air entraining agents, do not affect Mearlcrete Foam. For this reason, the density of Mearlcrete Foam Concrete can be controlled with unusual exactness.

3 **IT IS EASY TO HANDLE.** Mearlcrete Foam Concrete can be poured in place or pre-cast, air cured or autoclaved. Because of its stability, it can be placed in large volumes from a central mixing station by pneumatic pressure, achieving great savings in time and labor.

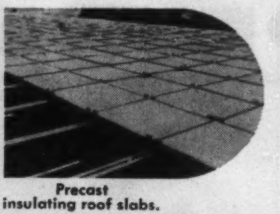
4 **IT IS LOW IN COST.** Mearlcrete Foam Liquid is used in such small amounts, that its costs represent only a tiny fraction of the total. In addition, savings in aggregate costs are made possible, because Mearlcrete, using readily available air, can replace part or all of any lightweight aggregates.

5 **IT HAS MANY APPLICATIONS.** Mearlcrete Foam Concrete has already proven itself advantageous for many applications, including tank and pipe insulation, insulation for thin wall panels, floor fill, roof fill, and many autoclaved products. The Mearl staff is ready to assist you in developing any specific applications.

Insulation for slab-on-grade construction.



Tilt-up sandwich panel.



Precast insulating roof slabs.

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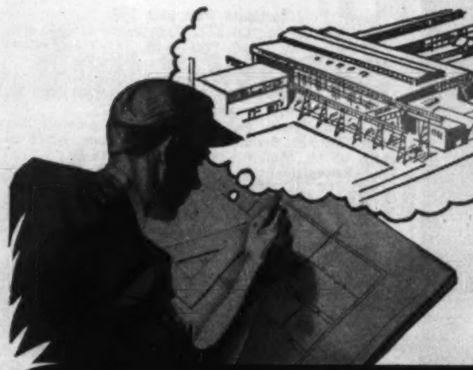
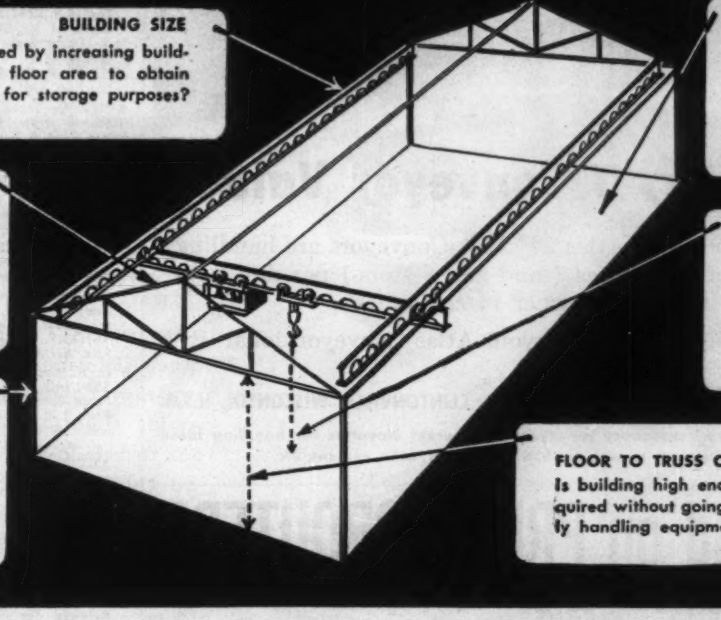


Don't Forget *Materials Handling* When Designing the Building



BUILDING SIZE
How much will be saved by increasing building height instead of floor area to obtain necessary cubic space for storage purposes? Usually it costs less.

ROOF TRUSS CAPACITY
Will roof trusses carry Tramrail, or other conveyors, in addition to other usual loads?

COLUMN SIZE
Are columns heavy enough to support overhead handling equipment and moving loads? Will they take possible future larger size loads?

FLOOR
Is floor designed to withstand wear and tear of heavy floor truck traffic without undue costly maintenance?

MAXIMUM LIFT
What will be maximum lift required? What load weight? What is weight and clearance dimensions of equipment to handle this load?

FLOOR TO TRUSS CLEARANCE
Is building high enough to secure lift required without going to special, more costly handling equipment?

The foremost demand of a new factory building, whether for production or storage, is that its design and construction aid overall operating efficiency to the utmost. Thus, the building becomes more than just an enclosure, but is actually a vital part of the manufacturing process.

It is, therefore, imperative that the various steps entering into the making of an item be thoroughly considered when the building is designed. One of the most important of these concerns materials handing because this item often amounts from 25% to 50% of the total production cost, and, also, because it is plant-wise in nature.

Regardless of what handling methods are deemed best, overhead cranes or Tramrail, roller or chain conveyors, floor trucks, etc., the building design, size and construction usually has a tremendous bearing on the ultimate handling efficiency secured. Building clearances, floor construction, column locations, aisleway allowances and other factors must be considered for the different handling methods for most satisfactory results.

For initial economy in installation, for most satisfactory operation and highest efficiency, plan for materials handling when you design the building. ***Do not make materials handling an afterthought.***

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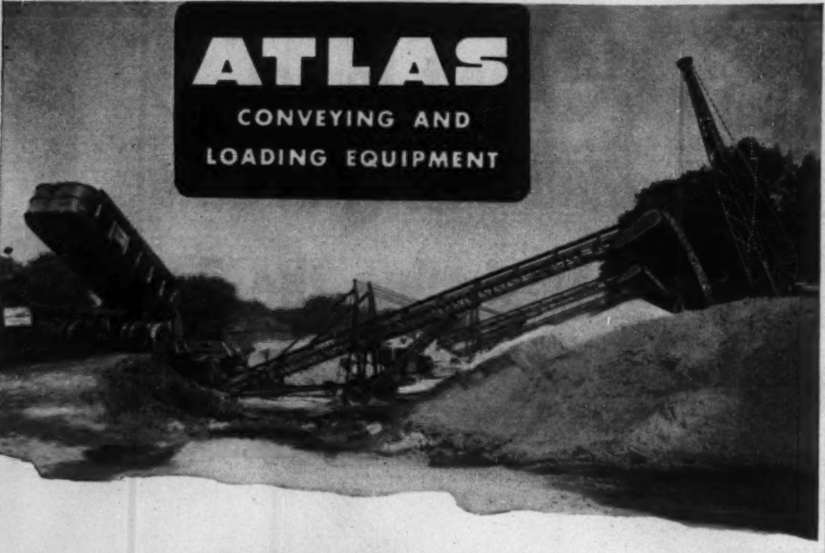

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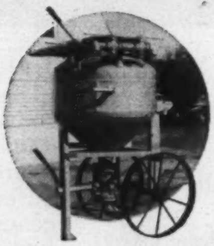

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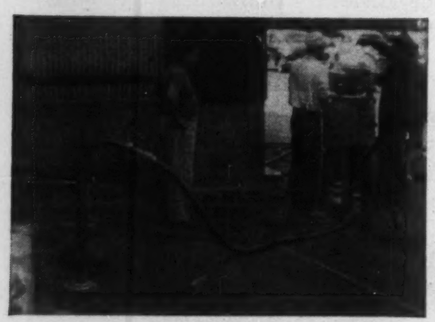

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(Continued from page 332)

etc., Midland Co.; LB **$711,403**, flexible base, b. conc. 7.897 mi. Hy. US 80, Proj. F 19 (14), etc., Eastland Co.;

Tex.—**Ivan Dement**, P. O. Box 1787, Amarillo, Tex., LB **$810,112**, flexible base, hot mix b. conc. 17.947 mi. Hy. US 83, Proj. F 581 (11) Jones Co.;

Tex.—**Gilvin-Terrill, Inc.**, P.O. Box 2268, Amarillo, Tex. LB **$245,321**, flexible base, hot mix b. conc. 6.512 mi. Hy. US 60, Proj. F 639 (8), Deaf Smith Co.;

Tex.—**Heldenfels Bros.**, P.O. Box 1917, Corpus Christi, Tex., LB **$126,818**, grading, structures, base, surf. 7.713 mi. Hy. FM 1833, Proj. R 2077-2-1, Nueces Co.;

John G. Holland, P. O. Box 14097, Houston, Tex., LB **$688,130**, Deepwater-Port storm sewerage sys. Hy. ST 73, Proj. UI 1052 (27), Harris Co.;

Tex.—**Ernest Loyd**, P. O. Box 1120, Fort Worth, Tex., LB **$254,626**, grading, structures, base, surf. 11.579 mi. Hy. FM 931 and 1829, Proj. S 1415 (2), etc., Coryell Co.;

Tex.—**J. W. Perry**, 501 Insuance Bldg., San Antonio, Tex. LB **$184,867**, grading, structures, base, surf. 4.947 mi. Hy. FM 585 and FM 1850, Proj. S 426 (2), etc., Brown Co.;

Tex.—**R. B. Smith, Inc.**, 3702 Glen Haven St., Houston, Tex., LB **$247,199**, flexible base, two course surf. tr. 4.776 mi. Hy. SH 62, Proj. S 500 (2), Jasper Co.;

Tex.—**South Texas Constr. Co.**, P. O. Box 3536, Corpus Christi, Tex., LB **$177,785**, flexible base, b. conc. 2.145 mi. Hy. FM 1576, Proj. C 1504-1-5, Cameron Co. Bids Sept. 14. CD 8/19, 8/29, 9/2, 9/6.

▲ **TEXAS**—Texas Turnpike Auth., 214 First Federal Savings Bldg., Austin, Zone 1,

Austin Road & Bridge Co., 1000 Singleton Blvd., Dallas, Tex., LB **$1,856,822**. Trinity River Bridge, Beckley Ave. grade separation and approach grading, Proj. D-FW24, Dallas Co. Bids Sept. 13. CD 8/24.

Houston County Electric Co-operative, Crockett, Tex. Own Forces. **$75,000**, some new lines and sys. imprvs., Houston Co., TEXAS. CD 4/13.

Navarro County Electric Co-operative, Corsicana, Tex. Own Forces. **$90,000**, some new rural line extens., Corsicana, Navarro Co., TEXAS. CD 4/13.

† **Leslie Miller, Inc.**, 5324 E. Lancaster St., Fort Worth, Tex., LB **$167,026**, est. $160,931 aircraft refueling sys. extens. Abilene Air Force Base ENG-41-443-56-14, ABILENE, TEX. U. S. Eng., 100 W. Vickerey Blvd., Fort Worth, Tex. Bids Sept. 14. CD 8/25.

† **L. H. Lacy Co.**, 5630 Yale Blvd., Dallas, Tex., LB **$539,740**, est. $554,345, apron paving, Bergstrom Air Force Base, ENG-41-443-56-16, AUSTIN, TEX. U. S. Eng., 100 W. Vickery Blvd., Fort Worth, Tex. CD 9/8, under LB.

E. E. Farrow Co., 2128 Hawes St., Dallas, Tex., LB **$310,086** base; LB **$354,115**, Alt., est. $400,000. 24 and 27 in. water supply lines, DENTON, TEX. City, City Hall, Denton, Tex. Freese & Nichols, 407 Danciger Bldg., Fort Worth, Tex., engrs. Bids Sept. 12.

City, City Hall, Garland, Tex. Own Forces. **$75,000**, storm sewers rehabilitation; **$85,000**, unit of sanitary sewer transmission line, GARLAND, TEX. CD 8/18.

Lee & McKnight, Contractors, 7220 Canal St., Houston, Tex., LB **$89,268**, est. $118,800. Lockwood sewers, HOUSTON, TEX. City, City Hall, Houston, Tex. Frank Baldwin, dir. P. Wks. Bids Sept. 10.

Norton E. White, M. Esperson Bldg., Houston, Tex., LB **$251,399**, bridge over White Oak Bayou and an underpass at MKT. Ry., HOUSTON, TEX. City, City Hall, Houston, Tex. CD 9/8.

City, Tyler, Tex. Own Forces. **$65,000**, c. I. water lateral lines, TYLER, TEX. CD 8/25.

MONTANA—State Hy. Comn., Helena,
rejected bids July 27, bridge over Missouri River on Montana Hy. 19 between Malta and Grassrange, Fergus Co. CA **$599,788**, (Correction-status). CD 8/3, under CA.

COLORADO—State Hy. Dpt., 518 State Office Bldg., Denver,

Schmidt Constr. Co., Box 66, Grand Junction, Colo., CA, **$719,055**, est. $716,000, grading, structure plant mix asph. surf. 6.006 mi. Lafayette and Broomfield. IN-002-1 (11) Adams Co. Bids Sept. 9, awarded Sept. 12. CD 8/31.

BUILDINGS—LB & CA

▲ **McGough Bros.**, 1954 University Ave., St. Paul, Minn. CA Total est. **$15,000,000**. general contract superstructure 100,000 kw. steam GENERATING PLANT addn,. at owner's High Bridge site, ST. PAUL, MINN. Northern States Power Co., 15 S. Fifth St., Minneapolis, Minn. CD 2/1/54.

Enterprise Engine & Machinery Co., 18 and Florida Sts., San Francisco, Calif., LB, **$120,806** furnishing, installing diesel engine GENERATING UNIT, dual fuel in municipal power plant, LAKE MILLS, IOWA. City, Lake Mills, Iowa. Bids Sept. 12. CD 8/18.

B. L. **McGee**, 1320-F East 51st St., Austin, Tex. LB **$442,000**. WAREHOUSE and SHOP BLDG., CARPENTRY and PAINT SHOP, LABORATORY and RESIDENT ENGINEERS OFFICE at site of new District Office Bldg. on Interregional Hy. near Junction Hys. 290 and 81, AUSTIN, TEX. State Hy. Dpt., Austin, Tex. Wilson & Cottingham, Brown Bldg., Austin, Tex., structural engrs. A. T. Moses, 1011 W. 34 St., Austin, Tex., mechanical engr. Bids Sept 14. CD 8/31.

▲ **Robert E. McKee, General Contractor, Inc.**, 2708 Inwood Rd., Dallas, Tex., CA **$3,682,634**, general constr. incl. all utilities for 14 story Unit No. 1, RETAIL SHOPS, DALLAS, TEX. Exchange Park, c/o Wm. Blakley, 1307 Pacific St., Dallas, Tex. Lane, Gamble & Assocs., 2520 Mockingbird Lane, Dallas, Tex., archts. Powell & Powell, Thomas Bldg., and

(Continued on page 337)

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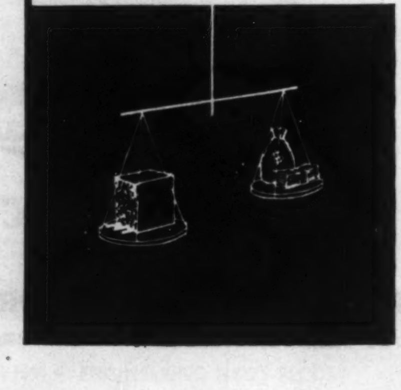

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CONCRETE REINFORCING STEEL INSTITUTE

(Continued from page 334)

Blum & Guerrero, 4930 Maple St., Dallas, Tex., engrs. Bids Sept. 2. CD 7/28.

Sears, Roebuck & Co., 916 N. Piedras St., cancelled bids to have been opened Sept. 9, MERCANTILE STORE EXPANSION, SERVICE STATION, EL PASO, TEX. Est. **$350,000**. CD 8/29.

Wedgemont Constr. Co., Box 11135, Fort Worth, Tex., CA **$416,616**. 48 addnl. DWELLINGS, FORT WORTH, TEX. G & H Land Co., Box 11131, Fort Worth, Tex. CD 8/18.

E. E. Cloir, Builder, 200 Burnett St., Fort Worth, Tex., CA **$354,450**, 27 DWELLINGS, FORT WORTH, TEX. E. E. Cloir, 200 Burnett St., Fort Worth, Tex. CD 8/18.

J. M. McClaine, 1005 Bayland St., Houston, Tex. Own Forces. **$358,700**. 32 DWELLINGS, HOUSTON, TEX. CD 8/18.

▲ **Tellepsen Constr. Co.**, 1710 Telephone Rd., Houston, Tex., CA, **$1,423,190**. clubhouse, foundation work, incl. grading, earthwork on grounds youth center with athletic course and playgrounds; rein.-con. swimming pool with related structures, HOUSTON TEX. Houston Country Club, 7000 Harrisburg Blvd., Houston, Tex. Bids Aug. 30. CD 8/5.

▲ **Bibb Brothers**, 100 Arvin St., San Antonio, Tex., CA **$1,250,000**. PETROLEUM CENTER; CA **$60,000** water sys.; CA **$60,000** earthwork, grading; CA **$90,000**, drainage, hard paving adjacent to Petroleum Center and hard paved auto parking center, SAN ANTONIO, TEX. Grand total $1,460,000. Petroleum Center, c/o Al Jergins & Assocs., Alamo Natl. Bldg., San Antonio, Tex. CD 9/14.

A. A. & E. B. Jones, 1050 S. Jason St., Denver, Colo., CA, **$312,839**. general contract 1 story, mezzanine, 158x400 ft., concrete block, structural steel, brick WAREHOUSE, SALESROOM and OFFICE, DENVER, COLO. Pittsburgh Plate Glass Co., 2619 Walnut St., Denver, Colo. Bids Aug. 8, awarded Aug. 10. CD 8/9.

▲ **Lembke-Clough & King, Inc.**, Box 455, Albuquerque, N. M., LB **$567,453**. Elementary SCHOOL; LB **$649,-056**. masonry GYMNASIUM and PHYSICAL EDUCATION BLDG., LOVINGTON, N. M. Lovington Municipal Bd. Educ., Lovington, N. M. Schafer, Merrill & Assoc., 114 E. 14 St., Clovis, N. M., archts. Bids Sept. 8.

FAR WEST

HEAVY CONSTRUCTION—BA

▲† **California**—BA 10/11—U. S. Eng., 751 S. Figueroa St., Los Angeles, Los Angeles River Imprvt., Corbin Ave. to Reseda Blvd., River Mile 48.92 to 47.12, Los Angeles. $2,000,000. CD 12/17/52.

† **Idaho**—BA 10/20—U. S. Eng., City-County Airport, Walla Walla, Wash., operations bldg., Lucky Peak Dam, CIVENG- 45-164-56-14. CD 12/4/52.

HEAVY CONSTRUCTION—LB & CA

† **C. B. Lauch Constr. Co.**, 5404 Cedar St., Boise, Idaho, LB, **$163,503**, est. $201,485, face rehabilitation of Black Canyon Dam, Boise Proj., Spec. DC 4484, IDAHO. Bureau Reclamation, Dpt. Interior, Boise, Idaho. Bids Sept. 7. CD 8/1.

† **Olof Nelson Constr. Co.**, Logan, Utah, CA, **$148,905**, earthwork, structures for laterals, sublaterals and well stilling pools from Group 4 wells, Minidoka Proj., North Side Pumping Div., Spec. 100-230, IDAHO. Bureau Reclamation, Dpt. Interior, Rupert, Idaho. Bids Aug. 16, awarded Sept. 1. CD 8/4.

WASHINGTON—State Hy. Comn., Dpt. Hys., Olympia,
Northwest Constr. Co., 3950 6 Ave. N.W., Seattle, Wash., LB, **$87,148** (7 bidders) grading, surf., bit. penetration macad. 1.34 mi. Secondary State Hy. 17-A, concrete vicinity F.A.S. S0208 (4), Skagit Co. Bids Sept. 13. CD 8/26.

WASHINGTON—State Hy. Comn., Olympia,
C. A. Power, E. 3711 Olive St., Spokane, Wash., LB, **$94,765**. (6 bidders) rein.-con. rigid frame slab bridge for Sullivan undercrossing on Primary State Hy. 2, with draining, grading, surf., b. conc. paving approaches, F.A.P. IN-002-6 (17), Spokane Co. Bids Sept. 13. CD 8/26.

CALIFORNIA—State Div. Hys., Sacramento,
Calif.—**J. Henry Harris**, 2659 9 St., Berkeley, Calif., LB,**$86,962**. traffic signal sys., hy. lighting, channelization at intersection of Hy. 40 with Union Oil Co. crossroad at Oleum Contra Costa Co.;
Calif.—**Charles L. Harney**, 575 Berry St., San Francisco, Calif., LB **$85,644**. relocating intersection, channelization and installing traffic signal sys., U.S. 101 at Alemany Blvd. at Crescent Ave., San Francisco Co. Bids Sept. 14. CD 8/19.

CALIFORNIA—State Div. Hys., 120 S. Spring St., Los Angeles,
N. L. Basich, 1148 N. San Gabriel St., South San Gabriel, Calif., LB **$114,994**, est. $125,000 (2 bidders) plant mix surf. from Adams Ave. in El Centro to south city limits of Brawley, Imperial Co. Bids Sept. 15. CD 8/19.

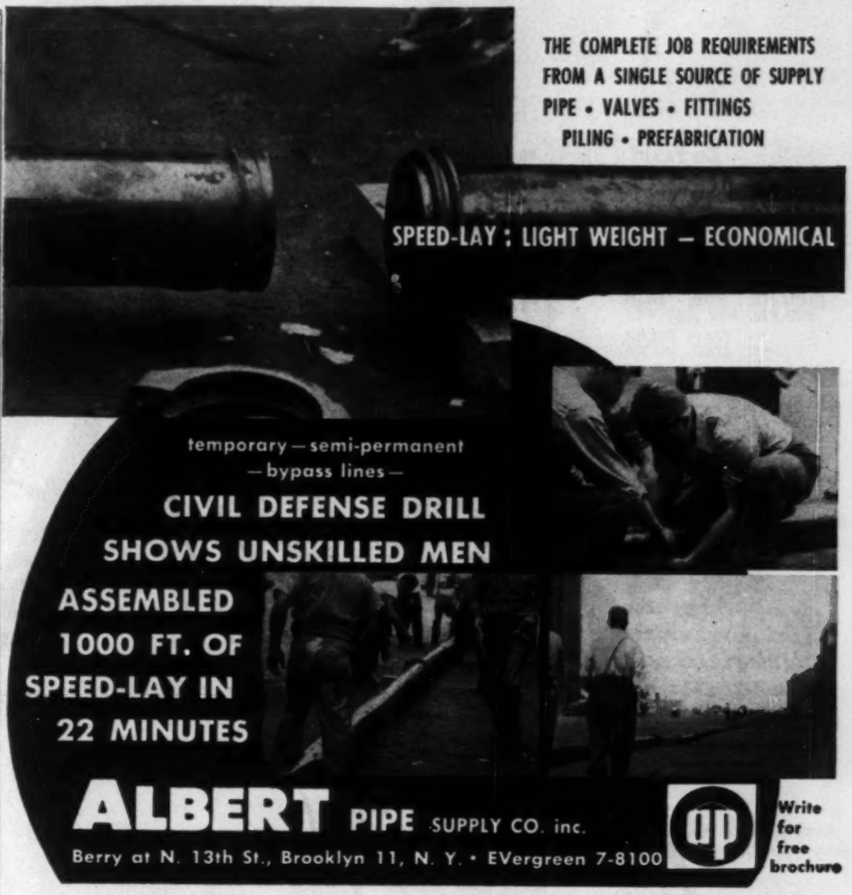
Ransome Co., 4030 Hollis St., Emeryville, Calif., LB, **$495,670** (7 bidders) Crockett Highway Unit No. 2, MARTINEZ, CALIF. Contra Costa Co., c/o clerk, Court House, Martinez, Calif. CD 6/10/52.

C. Norman Peterson Co., 2832 9 St., Berkeley, Calif., LB, **$474,832** (9 bidders) sewage treatment plant to serve Parkway Estates subdivision and other subdivision south of SACRAMENTO, CALIF. Sacramento Co., 7 and I Sts. Sacramento, Calif.

BUILDINGS—LB & CA

▲ **Pacific Co.**, 801 Cedar St., Berkeley, Calif., CA, **$2,222,000**. HIGH SCHOOL, 48-acre site, Pacific Ave. and Sargent Rd., LODI, CALIF. Lodi Union High

(Continued on page 340)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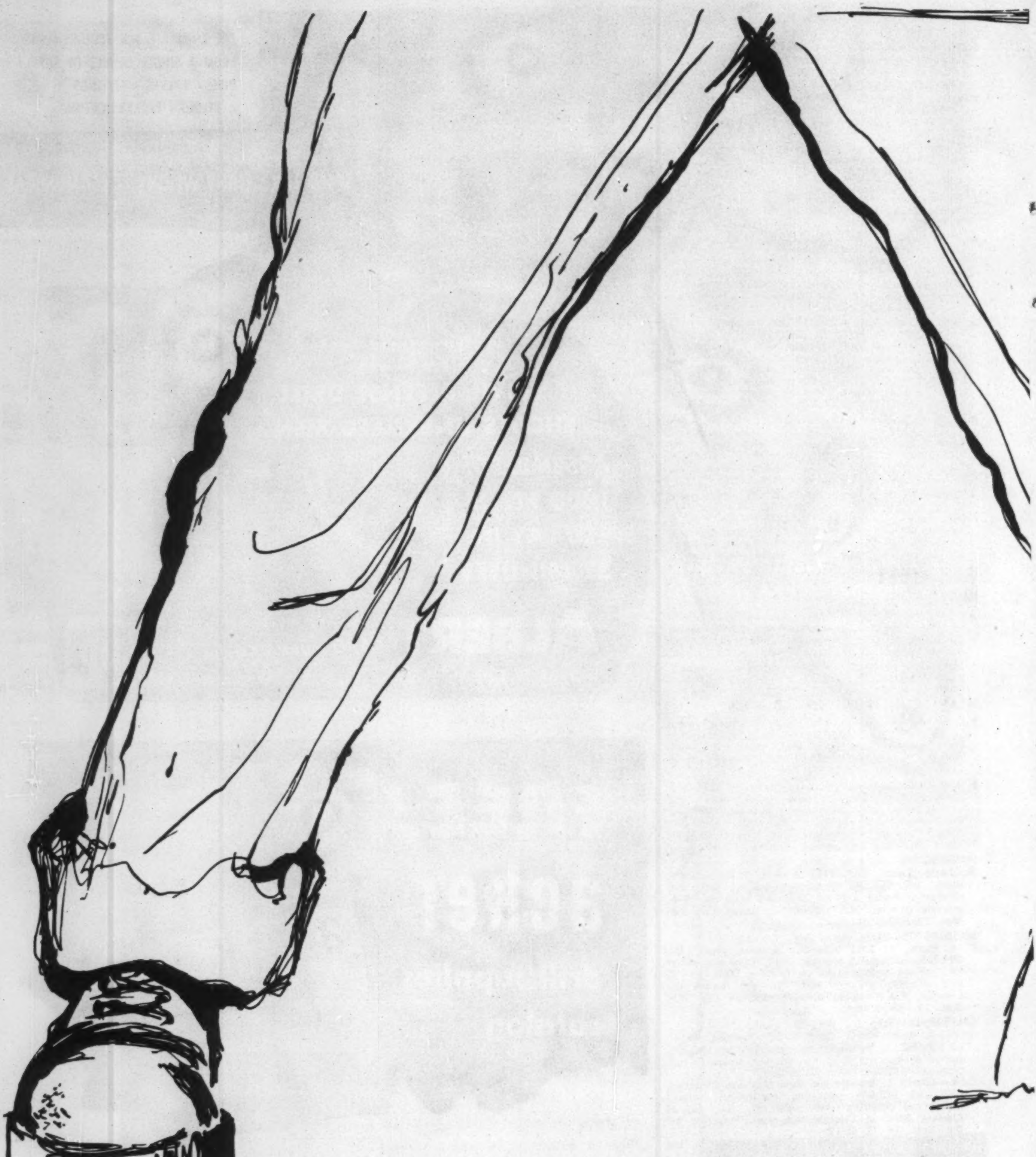

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CLEVELAND, OHIO

bridges

MACKINAC STRAITS
ST. IGNACE, MICHIGAN

HUDSON RIVER
TARRYTOWN, NEW YORK

CONNECTICUT RIVER
HARTFORD, CONNECTICUT

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ILLINOIS RIVER
PEORIA, ILLINOIS

REYNOLDS CHANNEL
(TWIN BRIDGES)
LONG BEACH, NEW YORK

JAMAICA BAY
ROCKAWAYS, NEW YORK

dams

FOLSOM, CALIFORNIA
NEWHALEM, WASHINGTON
KITCHENER, ONTARIO

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PEORIA, ILLINOIS
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industrial plants

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KAWERAU, NEW ZEALAND

NICKEL PLANT
NICARO, CUBA

WATER TREATMENT PLANT
FT. HOOD, TEXAS

POWERHOUSE SUBSTRUCTURE
ASHLAND CITY, TENNESSEE

CEMENT PLANT
HOWES CAVE, NEW YORK

FILTRATION PLANT
TORONTO, CANADA

AGGREGATE FOR POWERHOUSE
CORNWALL, ONTARIO

pipelines & marine oil terminal facilities

KURNELL, AUSTRALIA
BOMBAY, INDIA
ROTA, SPAIN
CLEVELAND, OHIO

radar bases

LABRADOR AND NEWFOUNDLAND

railroad relocation

CORNWALL, ONTARIO

vehicular tunnels

HAMPTON ROADS, VIRGINIA
BALTIMORE, MARYLAND

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Havana, Cuba
MERRITT-CHAPMAN & SCOTT CORPORATION OF DOMINICAN REPUBLIC
Ciudad Trujillo, Dominican Republic

(Continued from page 337)

School Dist., Lodi, Calif. Bids Sept. 8, awarded Sept. 14. CD 9/16, under LB.

Fabrizio & Martin, Inc., 55 Railroad Ave., South Norwalk, Conn., LB, **$484,990.** Springwood Elementary SCHOOL, NORWALK, CALIF. City Bd. Educ., c/o Supt. Schools, Norwalk, Conn. Bids Sept. 13.

▲ **Bayshore Constr. Co.,** 744 Folger Ave., Berkeley, Calif., CA, **$2,500,000.** rein.-con. APARTMENT, OAKLAND, CALIF. Co-Owners, Inc., c/o Donovan Peters, Mills Tower, San Francisco, Calif. Confer & Wills, 366 40 St., Oakland, Calif., archts. CD 10/7.

▲ **Stolte, Inc.,** 8451 San Leandro St., Oakland, Calif., CA, **$1,909,000,** E. M. Downer Junior HIGH SCHOOL, RICHMOND, CALIF. Richmond Union High School Dist., 1108 Bissel Ave., Richmond, Calif. Bids Sept. 12, awarded Sept. 14. CD 9/16, under LB.

Erickson Constr. Co., 1119 E. Bassett Law Ave., North Sacramento, Calif., CA, **$700,000.** 90,000 sq. ft. SHOPPING CENTER, incl. market, drug store and numerous shops, corner of Whitney and Watt Aves., SACRAMENTO, CALIF. Walker & Donant, 3232 Montclair St., Sacramento, Calif. Paul Hammarberg, 2941 Telegraph St., Berkeley, Calif., archt.

Cahill Brothers, 350 Sansome St., San Francisco, Calif., LB, **$945,000.** 113,950 sq. ft. FLOWER TERMINAL, SAN FRANCISCO, CALIF. San Francisco Flower Growers Assn. & California Flower Market, c/o Mario J. Campi, archt., 425 Bush St., San Francisco, Calif. Bids Sept. 6. CD 8/26.

CANADA

HEAVY CONSTRUCTION—BA

Ont., North Bay—WHARF—BA 10/5—Dpt. P. Wks., Hunter Bldg., Ottawa, wharf repairs, $84,000. Plans deposit $20. J. P. Carriere, c/o owner, engr.

N. S., Halifax—STEAM DISTRIBUTION SYSTEM—BA 10/6—Defence Constr. Ltd., 56 Lyon St., Ottawa, Ont., steam distr. sys. $700,000. Plans deposit $100.

Sask., Moose Jaw—WATER TREATMENT PLANT—BA 10/6—Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. water treatment plant, reservoir, water mains, Royal Canadian Air Force Base. $100,000. Plans deposit $100.

BUILDINGS—BA

N. S., Bedford Basin—MAGAZINES—BA 10/4—Defence Constr. Ltd., 56 Lyon St., Ottawa, Ont., 2 magazines, R.C.N.A.D. $150,000. Plans deposit $100.

Ont., Camp Borden—SCHOOL—BA 10/4—Defence Constr. Ltd., 56 Lyon St., Ottawa, R.C.D.C. School at Army Camp. $350,000. Plans deposit $100.

Ont., London—MESSES—BA 10/4—Defence Constr. Ltd., 56 Lyon St., Ottawa, 2 officers' messes for 50 and conversion of 4 boiler rooms. $800,000. Plans deposit $100. CD 3/18/53.

Ont., Lakeview—STORES—BA 10/12—Defence Constr. Ltd., 56 Lyon St., Ottawa, returned stores bldg. $350,000. Plans deposit $100.

HEAVY CONSTRUCTION—LB & CA

Bennett & White Alberta, Ltd., 11239 83 St., Edmonton, Alta., CA **$597,883.** hangar addn., Cold Lake Royal Canadian Air Force Base, COLD LAKE, ALTA. Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. Bids Sept. 1, awarded Sept. 12. CD 8/23.

NEW BRUNSWICK—Dpt. P. Wks., Parliament Bldgs., Fredericton,

Forbes & Sloat, Ltd., 654 Union St., Fredericton, N. B., CA **$189,135,** grav. 7 mi. Rte. 2 between Fredericton and Oromocto Bridge. Awarded Sept. 12. CD 2/4/44.

▲ **McNamara Constr. Co. Ltd.,** 42 Industrial St., Leaside, Toronto, Ont., LB, **$1,549,478,** concrete parking area for new terminal bldg., connecting asphalt taxiways, Gander Airport, GANDER, NEWFOUNDLAND. Dpt. Transport Hunter Bldg., Ottawa, Ont. Bids Sept. 9. C 8/30.

H. V. Randell Ltd., 280 New Gower Rd., St. John's Newfoundland, LB, **$78,820.** wharf repairs and extens., HOLYROOD, NEWFOUNDLAND, Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. A. A. Anderson, c/o owner, ch. engr.

Dickson-Larkey Welding & Steel Constr. Ltd., 27 Layton Ave., Toronto, Ont., CA **$219,887** (9 bidders) steam distr. sys., Canadian Army Base, BARRIEFIELD, ONT. Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. Awarded Sept. 13.

Domex Co. Ltd., 1290 Bay St., Toronto, Ont., LB **$156,849** (6 bidders) 2 span, 150 ft. steel girder rein.-con. bridge, road width 30 ft., across Credit River on Base Line Rd., COOKSVILLE, ONT. Toronto Twp., Municipal Offices, Cooksville, Ont. Bids Sept. 12. CD 8/29.

McGinnis & O'Connor Ltd., 394 King St. E., Kingston, Ont., CA, **$86,175.** macadam roads in city, KINGSTON, ONT. City, City Hall, Kingston, Ont. Awarded Sept. 12.

▲ **McNamara Constr. Co. Ltd.,** 42 Industrial St., Leaside, Toronto, Ont., LB **$1,542,000** (3 bidders) Intake No. 2, at R. C. Harris water purification and pumping plant, Queen St.; 4,800 ft. 8 in. diam. pipe concrete encased, steel shell to extend into lake, TORONTO, Ont. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. H. G. Acres & Co., Ltd., 2135 Culp St., Niagara Falls, Ont., and Gore & Storrie, 1130 Bay St., Toronto, Ont., engrs., CD 9/3/54;
Brush Aboe (Canada) Ltd., 296 Richmond St. W., Toronto, Ont. LB **$661,536** and **$696,524** (6 bidders) 4 diesel engine generators and auxiliaries, supply and installation, John St. Pumping Station (Toronto, Ont.);
Ontario Electrical Constr. Co. Ltd., 494 King St. E., Toronto, Ont., LB **$137,000.** electrical equip. for Scarborough Filtration Plant exten., Kingston and Kennedy Rds. (Toronto, Ont.).

Warren Bituminous Paving Co. Ltd., 1454 Bloor St. W., Toronto, Ont., LB **$412,882,** street wid'n., incl. storm sewers, Bathurst St. from Briar Hill to Wilson Aves., TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. Bids Aug. 22.

BUILDINGS—LB & CA

▲ **M. F. Schurman Co. Ltd.,** Eustane St., Summerside, P.E.I. CA, **$1,010,085,** 11 QUARTERMASTER and TECHNICAL STORES BLDG., Canadian Army Camp, Contract J, Gagetown, FREDERICTON, N. B. Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. Bids Aug. 3, awarded Sept 9. CD 7/11.

▲ **Hamilton Bridge Div., Bridge & Tank Co., of Canada Ltd.,** 231 Bay St. N., Hamilton, Ont. Total Est. **$5,000,000.** CA superstructure for WIRE MILL, 5-acre site, Hamilton Bay at Parkdale Ave., HAMILTON, ONT. Steel Co. of Canada Ltd. Wilcox St., Hamilton, Ont. Awarded Sept. 12. Norman Wagner & Associates Ltd., 42 James St. W., Hamilton, Ont., engrs., CD 7/12, under CA;
Canadian Comstock Co. Ltd., 36 James St. S., Hamilton, Ont., CA, mechanical trades (Hamilton, Ont.).

Doran Constr. Co. Ltd., 5 Concord St., Ottawa, Ont., CA, **$345,000.** STORE addn., alterations, 156 Sparks St., OTTAWA, ONT. Zeller's Ltd., 5115 Tans Island, Montreal, Que. J. A. Ewart, Booth Bldg., 165 Sparks St., Ottawa, Ont., archt.

▲ **Foundation Co. of Canada Ltd.,** 1900 Sherbrooke St. W., Montreal, Que., CA, **$3,000,000.** SYNTHETIC LUMBER MILL near hardboard pulp mill, STURGEON FALLS, ONT. Abitibi Power & Paper Co. Ltd., 408 University Ave., Toronto, Ont. Awarded Sept. 12.

Wingold Constr. Co. Ltd., 2559 Eglinton Ave. W., Toronto, Ont., CA Est. **$350,000.** 1 story, 175x331 ft. steel, brick FACTORY, concrete fdn., Warden Ave. and Comstock Rd., TORONTO, ONT. International Parts (Canada), Ltd., 71 Front St. E., Toronto, Ont. Awarded Sept. 13.

J. L. E. Price & Co. Ltd., 4664 St. Catherine St. W., Montreal, Que., CA, **$438,000** (8 bidders) FACTORY, Metropolitan Blvd. and 14 Ave., MONTREAL, QUE. Federated Metals (Canada) Ltd., Don Roadway, Toronto, Ont. Bids Aug. 30, awarded Sept. 12. CD 8/22.

Tellier & Groleau, 184 Ste. Cecile St., Three Rivers, Que., CA, **$453,000.** SCHOOL and AUDITORIUM, Canadian Army Camp, VALCARTIER, QUE. Central Mortgage & Housing Corp., 940 Cote de Liesse Rd., Montreal, Que. Bids Aug. 23, awarded Sept. 9. CD 8/5.

▲ **Community Enterprises Ltd.,** 5665 Pare St., Montreal, Que., CA, **$1,511,487** (8 bidders) 130 rein.-con. APARTMENT UNITS, Canadian Army Camp, VALCARTIER, QUE. Central Mortgage & Housing Corp., 940 Cote de Liesse Rd., Montreal, Que. Bids Aug. 2, awarded Sept. 9. CD 7/12.

(Continued on page 342)

Job site concrete at rock bottom cost

The mixing plant you see above is not fancy. But it produced 100 yards of *top quality* concrete a day.

The Dumpcrete you see at left is a *rugged low-cost* unit that hauled every load 8 *miles,* and delivered uniform concrete to the exact spot it was needed.

"We knew from experience what our 6 Dumpcretes could do," reports H. G. Helgerson, Pres. of McKoy Helgerson of Greenville, S. C. "So we set up the plant at a railroad siding 8 miles from our job at the Parris Island Marine Base."

"Our central plant and the Dumpcretes made a perfect team for handling the scattered pours," he says. "We're money ahead, because we've compared the costs."

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Perlite-concrete design

Lightweight Insulating Fireproof Concrete Roof Deck Specification Manual—By Dale A. Lehr, 218 pp. Perlite Division, Great Lakes Carbon Corp., 612 So. Flower St., Los Angeles 17, Calif. Limited free distribution.

Building designers will find very useful this new manual on perlite concrete for roof decks, in which, for the first time is taken an authoritative and sound engineering approach to a subject of growing importance. The book contains numerous tables and diagrams of roof construction that simplify design. A looseleaf binder enables supplementary information to be added later, when available.

Perlite aggregate, formed by "popping" a siliceous volcanic rock at 1,500 F, weighs less than one-tenth as much as sand or gravel. It can be used alone as a non-structural insulation fill or mixed with portland cement and water to form a lightweight structural concrete of high insulative value. The book presents data for both types of application.

Design tables in the manual enable a designer to pick out the thickness of roof deck required for various mixes to obtain a desired overall insulation value. The compressive strength of the slab also is given, thus enabling the designer to check the thickness for load-carrying capacity.

The tables give coefficients of heat transfer (U-values) for slabs on permanent forms of various types, on metal lath and on paper-backed wire mesh. The effect of ceilings is taken into account. Accompanying drawings show details of the various types of construction.

Also included in the manual are typical specifications and recommendations for mixing, handling and testing perlite concrete, technical data for subpurlins and a discussion of commonly encountered problems, with suggestions for avoiding or correcting them.

"Engineering News-Record" 6/29/54

This Solid Engineering Information Can Save You Hours on Every Job. *Don't Delay—Write Today* for Information on How to Get Your Copy of the Permalite Roof Deck Manual!

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Lightweight Insulating Concrete Roof Deck Construction

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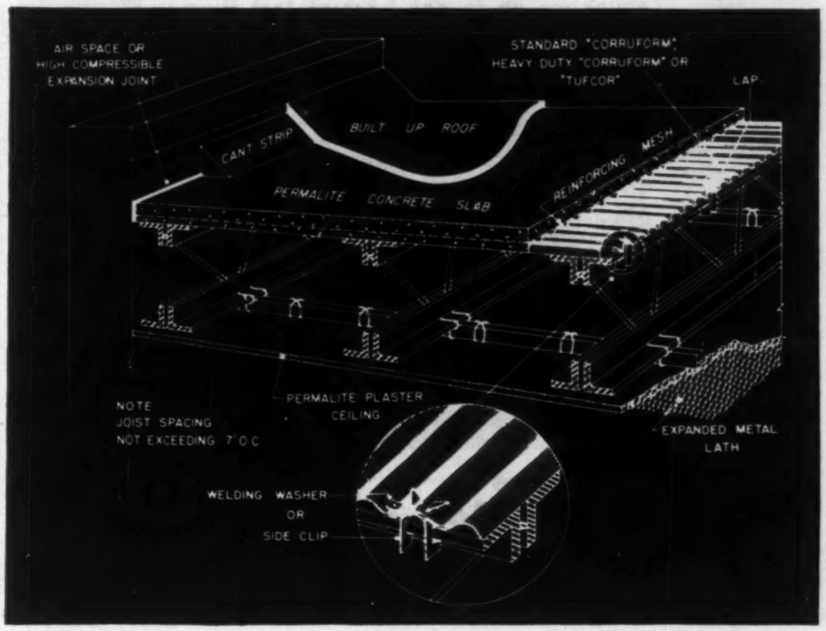
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The big, new Permalite Roof Deck Manual gives you, for the first time, *complete, factual, reliable data* on the use of lightweight, insulating concrete in open-web roof deck construction. Leading architects and designers agree that this 220-page volume provides complete engineering information in easy-to-use form . . . all the different roof forms and types of suspended ceilings, with page after page of tables on slab thickness, weights, strengths and U-factors, already worked out for you to make specifying quick, easy and accurate. You can get this authoritative handbook, packed with usable, every-day working information, from the Permalite franchisee serving your area — for his name and address

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**Perlite Division, Great Lakes Carbon Corp.,
612 So. Flower St., Los Angeles 17, Calif.**

(Continued from page 340)

▲ **Cap Construction Ltd.,** 299 Blvd. Ste. Madelein, Cap de la Madelein, Que., CA, **$1,242,042** (12 bidders) 142 HOUSING units at Canadian Army Camp, VALCARTIER, QUE. Central Mortgage & Housing Corp., 940 Cote de Liesse Rd., Montreal, Que. Bids July 26, awarded Sept. 9. CD 7/12.

▲ **Dawson & Hall, Ltd.,** 775 Clark Dr., Vancouver, B. C. LB **$4,256,738**, Alt. **$4,262,232.** 120-bed HOSPITAL, incl. NURSES RESIDENCE, STAFF QUARTERS, POWER HOUSE LAUNDRY, etc., WHITEHORSE, YUKON TERRITORY. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Bids Aug. 24. CD 7/19.

U. S. POSSESSIONS

HEAVY CONSTRUCTION—BA

† **Virgin Islands**—BA 10/20—Office of the Director, Virgin Islands P. Wks., Div. of Insular Affairs, Office of Territories, Dpt. Interior, Charlotte Amalie, St. Thomas, Virgin Islands, Proj. No. 53-103, constr. addnl. sect. intercepting sewer, paralleling existing 18 in. vitr. clay intercepting sewer, or meandering in the same general direction, from vicinity of NY Tvaer Gade to lift station near the French Village, to incl. one rein.-con. grit chamber; 11 concrete manholes; hauling and installing only, 260 lin. ft. 8 in., 500 lin. ft. 10 in., 1,070 lin. ft. 18 in. and 440 lin. ft. 20 in. pipe, Charlotte Amalie, St. Thomas. Plans deposit $20. R. L. Kenan & Assocs., Bell Bldg., Montgomery, Ala., consult. engrs.; adv. ENR 10/6.

AMERICANS ABROAD

HEAVY CONSTRUCTION—LB & CA

▲† **Enterprise Division of General Metals Corp.,** 18 and Florida Sts., San Francisco, Calif., U.S.A., CA **$1,500,000.** diesel engine generator sets, incl. large six and eight cylinder diesel engines with electric generators at Torrejon, San Pablo, Zaragoza and Moron Air Bases, for Bureau Yards & Docks, Dpt. Navy, 18 St. and Constitution Ave. N.W., Wash. 25, D. C., SPAIN. Brown-Raymond-Walsh, 122 E. 42 St., New York, N. Y., U. S. A., and Madrid, Spain, prime contractors.

Proposed Projects

WATER SUPPLY

▲ **Calif., Cucamonga**—Cucamonga County Water Dist., Cucamonga, voted **$1,200,000** bonds Aug. 30, water main construction. CD 8/22.

▲ **Calif., San Diego**—Valley Center Municipal Water Dist., San Diego, voted **$1,600,000** bonds Aug. 30, water distr. sys. CD 8/2.

Nev., Henderson—City, City Hall, voted **$550,000** bonds, sewerage sys.

SEWERS, WASTE DISPOSAL

▲ **Colo., Pueblo**—City, City Hall, sewage treatment plant. **$1,080,000.** Black & Veatch, 4706 Broadway, Kansas City, Mo., consult. engrs. CD 10/12/53.

▲ **Ga., Atlanta**—City, City Hall, sewage disposal plant to serve Adamsville, Simpson Road-Collier Road area **$150,000**, sewage disposal plant for Riverside area, **$150,000**, Wiedeman & Singleton, 760 W. Peachtree St. N. W., Atlanta, consult. engrs.; sewage disposal plant in College Park Section, **$1,200,000.** CD 7/23/54.

Ky., Hopkinsville—City, Contr. A, addn. to sewage treatment; Contr. B, sanitary sewers, **$750,000**, Howard K. Bell, 555 S. Limestone St., Lexington, consult. engr. Bids in 60 to 90 days. CD 4/11/51.

▲ **Mo., St. Louis County**—Metropolitan Sewer Dist., L. E. Ordelheide, exec. dir., 506 Olive St., St. Louis, Zone 1, 8 mi. trunk sanitary sewer ranging from 18- to 24-in. up to 5 ft. in Maline Creek sewer area in northwestern part of county, **$1,000,000**, Pitzman's Co of. Surveyors & Engineers, 804 Pine St., St. Louis, Zone 1, consult. engrs. CD 10/16/51.

▲ **Mo., St. Louis County**—Metropolitan St. Louis Sewer Dist., L. E. Ordelheide, exec. dir., 506 Olive St., St. Louis, Zone 1, constr. 8 mi. sanitary trunk sewer ranging from 36 in. to 5x6 ft. rein.-con. box section and also sewage treatment plant in Coldwater Creek area in northwestern part of county, **$1,000,000.** CD 9/14/53.

Nev., Henderson — City, City Hall, voted **$750,000** bonds, water imprvs.

STREETS AND ROADS

▲ **NEW YORK**—Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany,

Orange Co.—5.9 mi. arterial route system within the city of Port Jervis and hy. connections outside of city, **$3,190,000.**

Wash., Prosser—Benton Co., Court House, road construction in Kennewick Highlands Irrigation Project, **$750,000.** D. Bean, engr.

EARTHWORK, WATERWAYS

▲ † **Georgia and South Carolina**—U. S. Eng., 200 East St. Julian St., Savannah, Ga. Hartwell Dam on Savannah River. Total **$94,000,000.** $3,000,000 Appropriated.

▲† **Kansas**—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., Stage III Tuttle Creek Reservoir, incl. left and right bank embankment, sections, spillway excav. and replacing construction bridge, **$7,500,000.** Bids in October. CD 6/1/44.

† **Maryland**—U. S. Eng., First and Douglas Sts. N. W., Wash. 25, D. C., constr. 3 flood control pumping stations on Ancastia River, Edmonston, Bladensburg and Colmar Manor, **$500,000-$1,000,000.** CD 3/11.

▲ **Massachusetts**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston, development North Shore of Plum Island, Newburyport, **$731,900**; development Watson's Pond, Taunton, **$350,000.**

▲† **Washington**—Bureau Reclamation, Dpt. Interior, Ephrata, irrigation facilities on Columbia Basin Proj. near Quincy, Othello and Connell, Grant, Adams and Franklin Counties, **$12,500,000.** Work to begin next year.

▲† **West Virginia**—U. S. Eng., Box 2127, 237 4th Ave., Huntington, plans by Gannett Fleming, Cordry & Carpenter, Inc., 600 N. Second St., Harrisburg, Pa., Sutton Dam, Sutton. CD 8/18.

AIRPORTS

▲† **Ala., Mobile**—DORMITORIES, etc.—U. S. Eng., 2301 Grant St., Mobile, runway, **$300,000-$1,000,000**, airmens' dormitories **$1,000,000-$5,000,000**, Bids About December; avgas bulk storage, **$300,000-$1,000,000.** Bids About September, above work at Brookley Air Force Base.

▲† **Ala., Selma**—RUNWAY—U. S. Eng., P.O. Box 1169, Mobile, Zone 7, runway **$1,000,000-$5,000,000**, Bids About February; airmens dormitories **$300,000-$1,000,000**, Bids About October, above work at Craig Air Force Base.

▲† **Fla., Fort Myers**—WARM-UP PAD, etc.—U. S. Eng., P.O. Box 4970, Jacksonville, warm-up pad and runway **$1,000,000-$5,000,000**; airmens' dormitories, **$1,000,000-$5,000,000**; officers' quarters, **$300,000-$1,000,000**, Bids about November; field maintenance hangar, **$300,000-$1,000,000**; organizational hangar **$300,000-$1,000,000**, Bids About January, above work at Buckingham Weapons Center.

▲† **Fla., Homestead**—APRON, etc.—U. S. Eng., P.O. Box 4970, Jacksonville, access apron and RW shoulders, **$300,000-$1,000,000**, Bids About September; hydrant refueling sys. **$300,000-$1,000,000**, vehicular parking **$300,000-$1,000,000**, officers club **$300,000-$1,000,000**, Bids about November, above work at Homestead Air Force Base.

▲ **Fla., Orlando**—AIRPORT IMPRVS.—U. S. Eng., P. O. Box 4970, Jacksonville, access apron and shoulder stabilization, **$300,000-$1,000,000**; organizational maintenance shop, **$300,000-$1,000,000.** Bids about September; operations facility, **$1,000,000-$5,000,000.** Bids about January, above work at Pinecastle Air Force Base. CD 1/31/51.

▲† **Kan., Salina**—AIRPORT IMPRVS.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., warmup pad

(Continued on page 345)

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Here's the body that takes a completely equipped shop to the job, and saves up to 75 minutes per day. Using the latest average service base rate of 6 cents a minute and an average saving of 30 minutes a day . . . Service-Master saves $478.00 worth of time a year. Available in sizes for ½, ¾, 1, and 1½ ton chassis — regardless of age or make. The coupon below will bring complete details.

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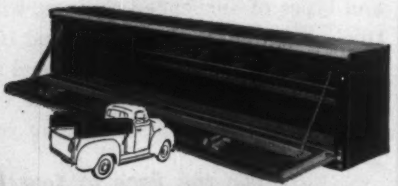

These easy-to-install tool and material compartments are finished in baked-on, medium-dark green enamel. Parts bins are built-in. Doors have slam-action catches, with locks keyed alike. Available with overhead rack.

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Commission on Regional Planning
The Metropolitan District, Hartford, Conn.

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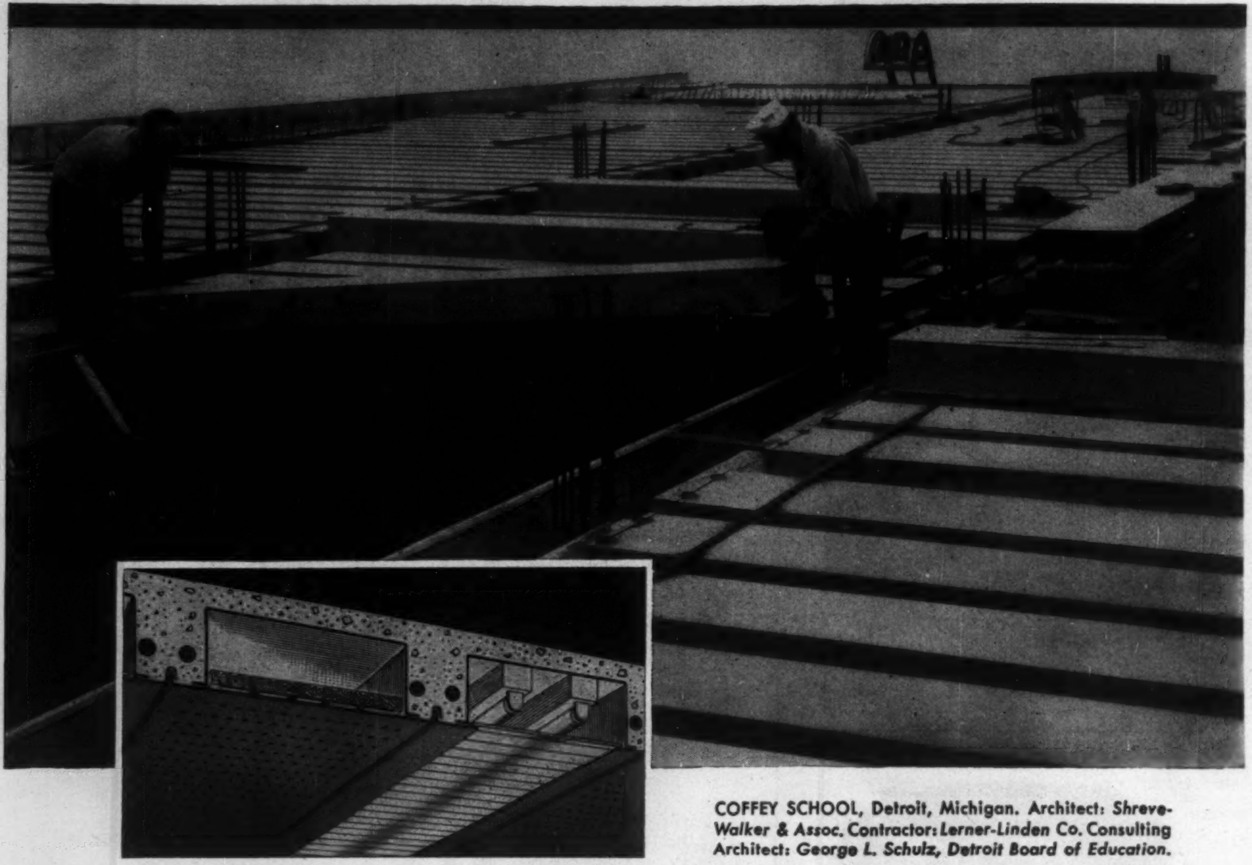

COFFEY SCHOOL, Detroit, Michigan. Architect: *Shreve-Walker & Assoc.* Contractor: *Lerner-Linden Co.* Consulting Architect: *George L. Schulz, Detroit Board of Education.*

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(Continued from page 342)

$200,000, primary runway $800,000; fire station $200,000; shop and A&E $200,000 and shop, org. maintenance $600.000. Bids in September [illegible] maintenance $3,200,000; officers quarters $200,000, and parachute shop $200,000, Bids in October; dental clinic $200,000, and gymnasium $400,000, Bids in November, foregoing work at Smoky Hill Air Force Base. CD 5/19/52.

▲† **Kan., Topeka**—AIRPORT IMPRVS.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., stabilized shoulder R/W $500,000, operations, base $200,000, shop, field maintenance (gen. purpose) $300,000, storage, flyaway kits $200,000, storage ordnance base $100,000 warehouse, bulk supply $300,000, and parachute shop $200,000, Bids about September; dental clinic, $200,000 and club, NCO $300,000, Bids about October; jet hydrants $200,000 shop, field maintenance (A&E) $200,000, and hydrant $100,000, Bids about November; hospital, $3,100,000, Bids about December, foregoing work at Forbes Air Force Base. CD 10/8.

▲† **Miss., Columbus**—RUNWAY, etc.—U. S. Eng., 2301 Grant St., Mobile, Ala., airfield paving runways, $1,000,000-$5,000,000, Bids in October; airmen's dormitories, $300-000-$1,000,000, Bids in December, above work at Columbus Air Force Base.

▲† **Mo., Grandview**—APRON, PARKING, etc.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., apron, parking, $500,000, Bids about October; hangar, field maintenance, $1,300,000, Bids about November; swimming pool, $200,000, Bids about January; shop, reserve hangar (AFRTC), $200,000, Bids about December; utilities, $100,000, Bids about November, above work at Grandview Air Force Base. CD 6/30/52.

▲† **Mo., Sedalia**—AIRPORT IMPRVS.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., A&E shop $100,000, commissary $100,000; service club $200,000, Bids about September; multi-purpose hangar, $500,000, Bids about October; warehouse, bulk supply, $200,000, Bids about November; runway, primary $1,800,000, stabilized shoulder $600,000, and sewage treatment plant $600,000, Bids about December, foregoing work at Sedalia Air Force Base. CD 1/6/54.

▲† **N. C., Fort Bragg**—PARKING APRONS, etc.—U. S. Eng., 308 Customhouse, Wilmington, parking apron, $1,000,000-$5,000,000, Bids in October; airmen's dormitories, $300,000-$1,000,000, Bids about November, above work at Pope Air Force Base.

▲† **N. C., Goldsboro**—HANGAR, etc.—U. S. Eng., 308 Customhouse, Wilmington, multi-purpose hangar, $300,000-$1,000,000, Bids About February; field maintenance hangar, $1,000,000-$5,000,000, Bids about September, 1956; hospital $1,000,000-$5,000,000, Bids About December, above work at Seymour Johnson Air Force Base.

▲† **S. C., Charleston**—AIR BASE BLDGS., etc.— U. S. Eng., Custom House, gymnasium, $300,000-$1,000,000. Bids about October 1955; squadron headquarter bldgs., $300,000-$1,000,000, Bids about October 1955; airfield paving runway, $1,000,000-$5,000,000, Bids about January 1956, above work at Charleston Air Force Base. CD 11/14/52.

† **S. C., Sumter**—PAVING, etc.—U. S. Eng., Customhouse, Charleston, airfield paving parking apron, Shaw Air Force Base, $300,000-$1,000,000. Bids about September 1955. CD 9/25/51.

† **Tenn., Smyrna**—PAVING—U. S. Eng., 306 Federal Office Bldg., Nashville, airfield paving, parking apron, Seward Air Force Base. $300,000-$1,000,000. Bids about September 1955.

▲† **Tex., Ellington Air Force Base**—DORMITORY, etc.—U. S. Eng., Box 1229, Galveston, plans by Stone & Pitts, 1872 Calder St., Beaumont, dormitory, dining hall, electrical distr. sys., operational bldg., Ellington Air Force Base, $5,000,000. Carter & Burgess, 1872 Calder Ave., Beaumont, consult. engrs. CD 8/25.

▲ **Ont., Windsor**—TERMINAL—Dpt. Transport, Ottawa, terminal bldg. at airport, $1,000,000. CD 5/25/43.

LATIN AMERICA

Mexico, Tuxtla Gutierrez—Aria. de Comunicacione, Mexico City, plans airport. $500,000. CD 3/26/51.

Mexico, Vallarta—Aria. de Comunicaciones, Mexico City, plans airport. $500,000.

PUBLIC BUILDINGS

Calif., Bakersfield — COUNTY UTILITIES — Kern Co., Court House, plans by Wright, Metcalf & Parson, 2323 "E" St., county utilities bldg., incl. all mechanical equip. $600,000.

Calif., Fontana—SCHOOL—Fontana School Dist., Fontana, plans by J. Dewey Harnish, 222 E "B" St., Ontario, Junior High School. $500,000. CD 5/19/53.

Calif., Martinez—GYMNASIUM—Contra Costa Junior College Dist., 1005 Escobar St., plans by Donald Hardison & Assoc., 225 Broadway, Richmond, gymnasium for West Contra Costa Junior College, $500,000. G. M. Simonson, 507 Howard St., San Francisco, consult. engr.

Calif., Monrovia — SCHOOL — Monrovia-Duarte High School District, Monrovia, $970,000 bond election Nov. 8 (first unit) of Duarte High School. CD 6/1.

Calif., Ontario—SCHOOL—Ontario Elementary School Dist., Ontario, plans by J. Dewey Harnish, 222 E. "B" St., School Plant No. 3, Benson and Kingsley Aves. $500,000.

Calif., Pasadena — ADMINISTRATION — Pasadena Bd. Educ., 351 S. Hudson Ave., plans by Neptune & Thomas, 1560 W. Colorado St., 3 story administration bldg. addn. $530,000.

▲ **Calif., San Jose**—HOSPITAL, etc.—Santa Clara Co., Court House, $5,125,000 bond election Oct. 25,

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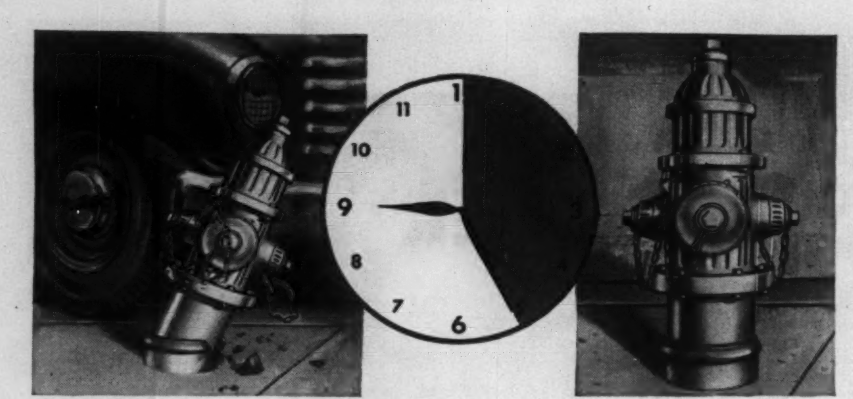

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▲ **Calif., San Mateo**—SCHOOLS—San Mateo City Elementary School District, 117 N. San Mateo Dr., $2,000,000 bond election Nov. 8, schools, CD 3/20/53.

Calif., Sebastopol—SCHOOL—Gravenstein Union School Dist., Cunningham, plans by Hammond & Woodbury, 530 3 St., San Rafael, 23,000 sq. ft., frame school. $650,000.

Calif., Stockton—SCHOOLS—Lincoln Unified School Dist. c/o Supt., 818 Lincoln Rd.; $900,000 bond election Nov. 19, high school and elementary school. CD 3/11.

Colo., Boulder—SCHOOL—Fairview Consolidated School Dist., Boulder, voted bonds Aug. 30, school, Cherryvale Rd. $550,000. Atchison & Kloverstrom, 257 Josephine St., Denver, consult. engrs. CD 8/9.

▲† **Colo., Denver**—PLANT EXPANSION—Atomic Energy Comn., 1901 Constitution Ave. N.W., Wash. 25, D. C., plans by Catalytic Constr. Co., archt.-engr., 1528 Walnut St., Phila., Pa., Rocky Flats Plant expansion, incl. two new buildings and related facilities, modification, 3 existing buildings $13,500,000. Dow Chemical Co., Midland, Mich. will operate this plant for AEC.

† **Ill., Danville**—THEATER—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C.; theater bldg. for Veterans Admin. Hospital. $750,000.

▲† **Kan., DeSoto**—BUILDING—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., bldg., $1,000,000. Bids about February; misc. constr., $500,000, Bids about January, above work at Sunflower Ordnance Works.

▲† **Kan., Fort Leavenworth**—HOSPITAL—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., hospital, $2,700,000. Bids about May. CD 10/31/46.

▲† **Kan., Fort Riley**—QUARTERS, etc.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., family quarters, $2,800,000, Bids about December; hangar and hardstand, $500,000, Bids about March; ammo igloos, $100,000, Bids about January; barracks $3,500,000, headquarters bldgs. $200,000, motor park facility and hardstand $100,000; motor repair shops $300,000, regimental dispensary $100,000, all foregoing Bids about April; classrooms, $200,000 and PX, service club and theater, $900,000, Bids about June.

Md., Towson—SCHOOL—Baltimore Co. Bd. Educ., Aigburth Rd., plans by Buckler, Fenhagen, Myer & Ayers, 2315 St. Paul St., Baltimore, Zone 18, 2 story, brick, stone, steel, rein.-con. Riverview School, near Essex, $500,000.

Mass., Rockland—SCHOOL—Town, School Bldg. Comn., c/o Supt. Schools, plans by J. Williams Beal & Sons, 185 Devonshire St., Boston, Senior High School, $600,000. (Correction—location of project). CD 9/9, under Mass., Brockton.

Mass., Wrenthan—SCHOOL—Towns Wrenthan, Norfolk and Plainville, Regional School District, c/o Walter M. Gaffney, archt., W. Main St., Hyannis, constr. King Philip Regional High School, Franklin St. $500,000.

Minn., Bird Island—SCHOOL—Bd. Educ., C. H. Ninow, clk., voted $450,000 bonds Aug. 10, school addn. $400,000. Swanson, Matson & Wegleitner, 500 Sexton Bldg., Minneapolis, archts. CD 1/19.

▲ **Mo., Chillicothe**—POWER PLANT—City, c/o City Council, $1,395,000 bond election Oct. 4, imprvs. municipal power plant.

▲ **Mo., Columbia**—DORMITORY—Curators of the University of Missouri, Jesse Hall, plans by Hellmuth, Obata & Kassabaum, 825 Locust St., St. Louis, Zone 1, dormitory, $921,100, cafeteria, $246,000. CD 3/1/46.

▲† **Mo., Fort Crowder**—MOTOR POOL FACILITY, etc.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., motor pool facility, $100,000; family quarters, $1,000,000. Bids about December.

▲ **Mo., Normandy** (St. Louis 21 P. O.)—SCHOOL—Normandy School Dist., Bd. Educ., Ward E. Barnes, supt. Schools, 7837 Natural Bridge Rd., Zone 21, $2,350,000 bond election Oct. 25, schools, addns., imprvs.

Mo., Rolla—DORMITORY—Missouri School of Mines & Metallurgy, Rolla, and c/o Curators of the University of Missouri, Jesse Hall, Columbia, plans by Hellmuth, Obata & Kassabaum, 825 Locust St., St. Louis, Zone 1, dormitory, $635,000; cafeteria, $300,000.

▲† **Mo., St. Louis**—Plant, etc.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., lead styphante and tetracene plant, $1,500,000, Bids about May; water supply, Tyson Valley, $100,000, Bids about May; diesel repair shop, $100,000, Bids about January, above work at St. Louis Ordnance Plant. CD 10/19/53.

▲ **Nev., Las Vegas**—COURT HOUSE—Clark Co., Court House, voted $4,000,000 bonds, Aug. 30, court house, Zick & Sharp, 1806 S. Main St., archts. CD 7/13.

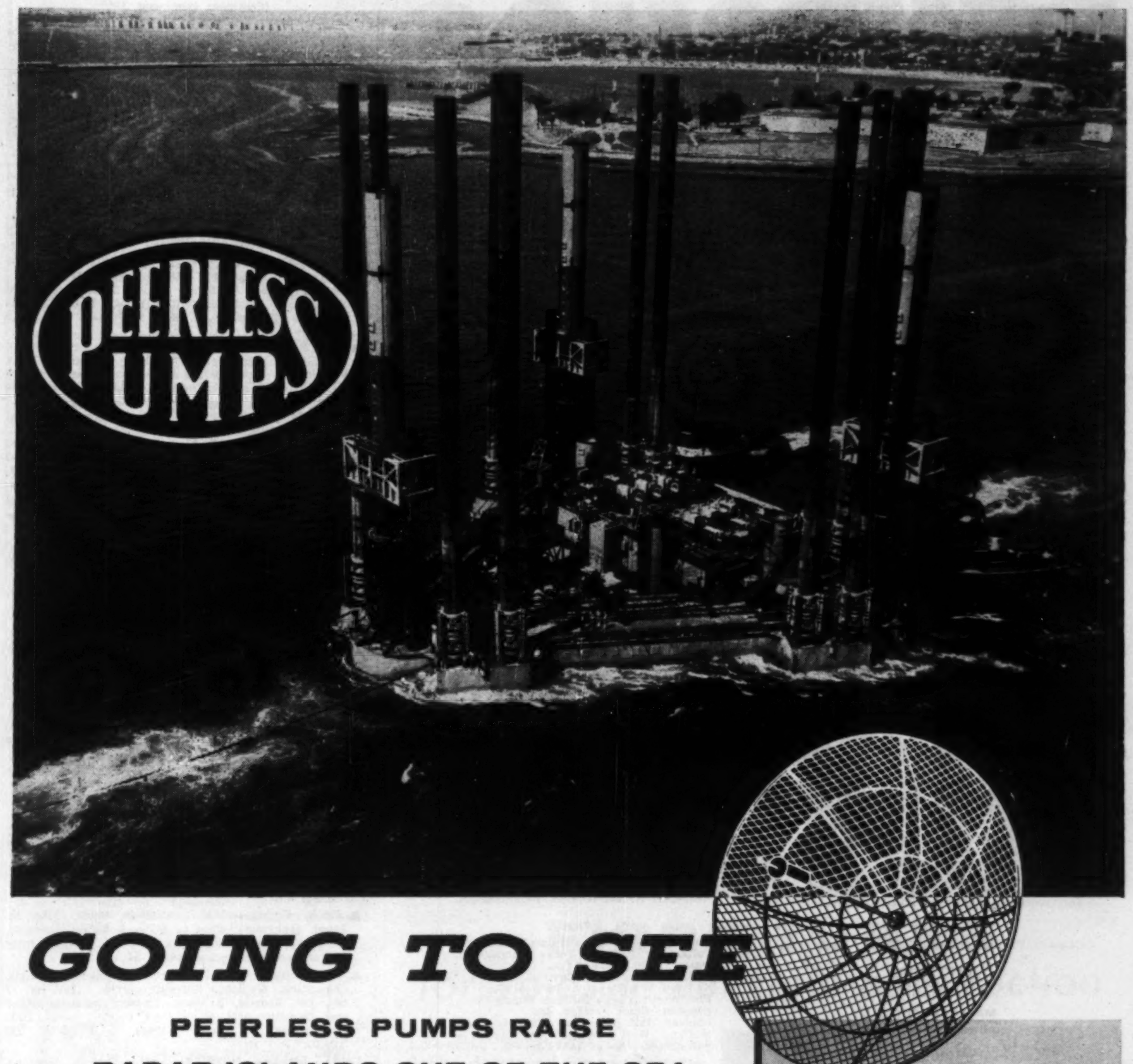
▲ **Nev., Reno**—COLLEGE BLDG.—University of Nevada, Bd. Regents, Morrill Hall, plans by Edward S. Parsons, 950 Marsh Ave., 4-unit College of Agriculture with administration and extension offices. $2,091,180.

▲ **N. Y., New York**—BUILDINGS—Dpt. P. Wks., Municipal Bldg., Zone 7, plans by Chapman, Evans & Delehanty, 50 Broadway, Zone 4, Proj. C-71, Part A new bldgs., alterations and addns. for Penitentiary Division; Part B alterations and addns. to existing bldgs. for Div. for Rehabilitable Adults, at Rikers Island Workhouse and Penitentiary, $9,400,000. CD 11/15/44.

▲† **N. C., Fort Bragg**—HOUSING—U. S. Eng., 308 Customhouse, Wilmington, 490 units family housing. $5,000,000. Bids About November. CD 12/26/51.

▲ **O., Akron**—EDUCATIONAL, etc.—Children's Hospital, Roger Sherman, admin., W. Bowery and W. Buchtel

(Continued on page 348)



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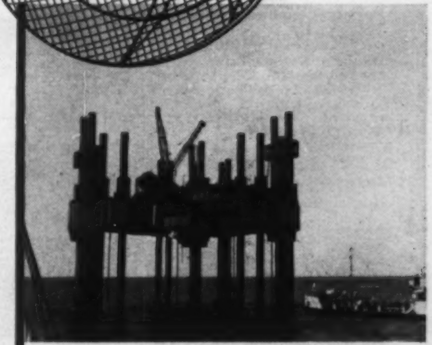

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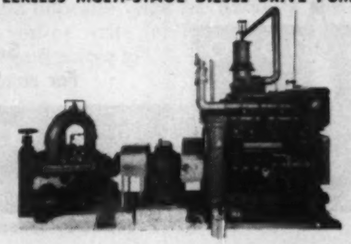

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Lansing: Capitol Steel Division of The Hausman Steel Company

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Lubbock: Don Davis Fine Bldg. Materials
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(Continued from page 346)

Sts., plans by Wagner & Luxmore, Permanent Bldg., education bldg., Bowery St., **$500,000;** addns. to present mechanical bldg. and laundry, **$175,000;** enlarging clinic and emergency section, **$344,000.**

O., **Massillon**—SCHOOL—Bd. Educ., Massillon, Franklin School, **$725,000,** Dalton & Dalton, Old Arcade, Cleveland, Zone 14, consult. engrs. CD 11/18.

Okla., **Bartlesville**—SCHOOL—Bd. Educ., Bartlesville, bond election Oct. 18, elementary school. **$625,000.** Geo. Rens, Bartlesville, archt.

▲ Pa., **Ardmore**—SCHOOL—Lower Merion School Dist., Ardmore, plans by Vincent G. Kling, 917 Corinthian Ave., Phila., Senior High School, **$3,000,000.** CD 11/5.

▲ Pa., **Erie**—SCHOOL—School Dist. of Erie, Pub. Library Bldg., **$1,000,000** bond election Nov. 8, 2 story, part bsmnt., brick Jo Ann Connell Grade School. Wm. Brennan, 315 Marine Bank Bldg., archt. CD 8/25.

Pa., **Larchmont**—SCHOOL—Marple Twp. School Bd., Broomall, plans by Baader Young & Schultze, 1500 Walnut St., Phila., elementary school. **$517,700** Bids 10/4 on test borings. Chester I. Duncan, 225 S. 15 St., Phila., engr. CD 4/26.

▲ Pa., **Pine Bank**—SCHOOL—New West Green School Dist., Pine Bank, plans by Beal & Parking, 601 Washington Trust Bldg., Washington, Junior Senior High School Center Twp. **$1,500,000.** Constr. in 1956.

▲ Tex., **Temple**—SCHOOLS—Temple Independent School Dist., c/o Newman Smith, supt., plans by Wyatt C. Hedrick Co., 1200 T & P Bldg., Fort Worth, two Junior High Schools, Dunbar High School addns. and two elementary schools addns. **$1,550,000.** CD 3/3.

Vt., **Brattleboro**—SCHOOL—Brattleboro School District, c/o Supt. Schools, 96 Green St., plans by Benhard Dirks, Mohawk Trail, Greenfield, Mass., grammar school in West Brattleboro, **$500,000.**

▲ Va., **Fairfax**—SCHOOLS—Fairfax County Bd. Educ., Court House, Fairfax, bond election Nov. 8, school constr. **$22,000,000.**

▲ Wash., **Longview**—WAREHOUSE—Port of Longview, Longview, 60,000 sq. ft. warehouse space and berthing for addnl. ships, **$1,300,000.**

▲ Wis., **Mendota**—HOSPITAL—State Dpt. P. Welfare, madison, plans by Roger C. Kirchhoff, state archt., Madison, hospital, **$4,300,000.** Bids in 1956.

COMMERCIAL BUILDINGS

Ala., **Birmingham**—APARTMENT—James W. Dewberry, 807 S. 20 St., plans by Allan L. Bartlett, 1779 Valley Ave., Zone 9, 44-unit apartment group in English Village Section. **$800,000.**

Ala., **Birmingham**—CHURCH, etc.—Hunter St. Baptist Church, 17 St. and 4 Court W., plans by George P. Turner, American Life Bldg., church-auditorium, air-conditioned, **$500,000.**

Calif., **Corona Del Mar**—MOTEL—Ingram, Collins & Blakesly, c/o Western Drafting Service, archt., 494 Newport Blvd., Newport Beach, 100-unit 2 story, 50,000 sq. ft., frame, stucco motel, **$500,000.** E. Zepelin-Springe, 494 Newport Blvd., Newport Beach, consult. engr.

▲ Calif., **Fresno**—HOTEL—California Hotel, John M. Lloyd, genl. mgr., plans by Stiles & Robert Clements, 1135 Van Nuys Bldg., Los Angeles, 2 story hotel and subterranean garage addn. **$1,100,000.**

▲ Calif., **Fresno**—HOTEL EXPANSION—Handlery Hotels, c/o Stiles & Robt. Clements, archts., 210 W. 7 St., Los Angeles, 2 story, 75-room hotel expansion incl. swimming pool, dining room, cocktail lounge, 200-car garage, 10 modern shops, **$1,100,000.** CD 12/30/52.

Calif., **Glendora**—HOSPITAL, etc.—Thomas Cosenino, 125 S. First Ave., Arcadia, 1 story, 32,000 sq. ft. hopsital and 16,000 sq. ft. medical bldg. **$500,000.**

▲ Calif., **Los Angeles**—SHOPPING CENTER—R. T. Moss, 227 S. Robertson Blvd., Beverly Hills, plans by W. E. Hillier, 227 S. Robertson St., Beverly Hills, 100,000 sq. ft. shopping center, 750-car parking, Tarzana, **$1,000,000.**

Calif., **Sacramento**—DWELLINGS—Fidelity Title Co., 811 J St., 27 one family dwellings in West Arden Oaks subdivision, at Watte Ave. and Cottage Way, **$540,000.**

Calif., **San Francisco**—HOSPITAL—St. Luke's Hospital, 27 and Valencia Sts., plans by Gardner Dailey, 442 Post St., 4 story, rein.-con. steel, hospital wing, Valencia and 27 Sts. **$800,000.** CD 4/25/51.

Calif., **San Francisco**—DISPATCH and AUDITORIUM HALL, etc.—San Francisco Bay Area Longshoremen's Memorial Assn., 150 Golden Gate Ave., plans by Henry Hill, 555 Clay St., dispatch and auditorium hall and administration bldg. **$600,000.** Isadore Thompson, 583 Market St., San Francisco, consult. engr. CD 1/19.

Conn., **Bridgeport**—HOSPITAL—Park City Hospital, George S. Hardy, chn. Bldg. Comn., 695 Park Ave. plans by Peter F. Petrofsky, 177 State St., 150 bed hospital, **$600,000.** Victor A. Frid, 862 Asylum Ave., Hartford, hospital consultant.

▲ Ill., **Champaign**—SHOPPING CENTER, etc.—Owner, c/o Mark Mercer Hotel, Danville Rd., Urbana, plans by Alfred H. Lasswith, 105 W. Green St., shopping center, motel, theatre, service station **$2,000,000.** CD 8/26.

Ill., **Wheaton** — SCHOOL — St. Frances Central High School, Wheaton, plans by Belli & Belli, 8 S. Dearborn St., Chicago, Zone 3, Catholic High School. **$750,000.**

▲ Ind., **Indianapolis** — SHOPPING CENTER — Gardner Lane Shopping Center, 46 and Shadeland Ave., shopping center, incl. 4 buildings with 30 units and 1,200 car parking area, **$1,000,000** or more.

▲ **Mich., Romeo**—SHOPPING CENTER—Edward Nordman, 117 S. Main St., shopping center, incl. 25 stores, Orchard Hills, **$2,000,000.**

▲ **Neb., Omaha**—SHOPPING CENTER—Brandeis Investment Co., 16 and Douglas Sts., shopping center, 72 and Dodge Sts., **$6,000,000-$10,000,000.**

▲ **N. J., Atlantic City** — MOTEL — 3400 Boardwalk Corp., att. Joseph G. Bradway, 3542 Atlantic Ave., Atlantic City, plans by J. Vaughn Mathis, Guarantee Trust Bldg., Atlantic City, motel, swimming pool and restaurant, **$1,000,000.** George R. Swinton, City Hall, city engr. CD 8/19.

▲ **N. J., Jersey City**—HOUSING—Urban Developers, Inc., c/o S. J. Kessler & Sons, archts., 551 Fifth Ave., New York 17, N. Y., slum clearance housing, comprising eight 16 story bldgs. for 2,000 families on tract bounded by Hudson Blvd., Summit Ave. and Newark Ave. and on adjoining tract opposite City Hall, **$16,000,000.**

▲ **N. Y., Bayport**—SHOPPING CENTER—Syndicate, Sydney M. Siegel, pres., 116-55 Queens Blvd., Forest Hills, plans by Gloster & Gloster, 253 Sunrise Hy., Rockville Center, shopping center, incl. 3 story department store, office, professional bldg., two supermarkets, drive-in-bank, 162 stores on 35 acre tract on northside of Montauk Hy. **$7,500,000.**

N. Y., Brooklyn — APARTMENT — Milan Development Corp., 26 Court St., Zone 2, plans by Philip Birnbaum, 12 E. 48 St., New York, Zone 17, 6 story apartment, 3402-24 Snyder Ave. **$773,300.**

N. Y., New York—OFFICE—Albert Levy & Martin Jaffe, c/o Wechsler & Schimenti, archts., 52 W. 46 St., Zone 19, 13 story office, Fourth Ave. and 28 St. **$750,000.**

O., Avon Lake—SHOPPING CENTER—Frielingsdorf Corp., Stop 65, Lake Rd., plans by Arnold A. Peterson, 3134 Euclid Ave., Cleveland, Zone 41, 53,240 sq. ft., shopping center, incl. 2 story bldg. with office space on second floor, 5-store unit, 1 store unit, Saddle Inn, **$750,000,** construction to start late this fall.

▲ **O., Bay Village**—HOMES—Scholz Homes, Inc., 2001 N. Westwood St., Toledo, 150 homes, on 74 acre site, **$4,500,000.**

▲ **O., Cincinnati**—HOSPITAL—Bethesda Hospital, Oak and Winslow Aves., hospital addn. to present facilities, **$1,500,000.**

▲ **O., Cincinnati** — HOSPITAL — Deaconess Hospital, Clifton and Straight Sts., hospital addn. **$2,800,000.** CD 12/1/49.

O., Cincinnati—HOSPITAL—Holmes Hospital, Eden and Bethesda Aves., hospital addn. **$950,000.**

▲ **O., Cincinnati**—HOSPITAL—Jewish Hospital, Burnet Ave., 9 story hospital addn., **$2,000,000,** constr. early in 1959; 2 story bldg. to extend clinical laboratories, 1½ story maintenance and storage bldg., **$780,000,** constr. early in 1957.

▲ **O., Cincinnati**—SHOPPING CENTER—Lang Bros, Inc., 5240 Lester Rd., 15-acre shopping center, Glenway Ave. and Werk Rd. **$2,000,000.** Nunlist & Frolicher, Traction Bldg., consult. engrs.

▲ **O., Cincinnati**—HOSPITAL—Our Lady of Mercy Hospital, Rowan Hills Dr., Mariemont, hospital addn. **$1,000,000.**

O., Cincinnati—HOSPITAL—St. Francis Hospital, Queen City Ave., hospital facilities addn. **$594,000.**

▲ **O., Cincinnati**—HOSPITAL—St. Mary's Hospital, 816 Betts St., hospital, **$4,500,000;** rehabilitation of hospital, **$500,000.**

▲ **O., Columbus**—HOSPITAL—White Cross Hospital, 700 N. Park St., plans by Inscho, Brand & Inscho, 44 E. Broad St., Columbus, and Schmidt, Garden & Erikson, 104 S. Michigan Ave., Chicago, Ill., hospital, W. North Broadway and Olentangy River Rd. **$7,000,000.** CD 2/19/47.

O., Franklin—SHOPPING CENTER—Edwin A. Mayer, Franklin, shopping center, near golf course on north edge of city, **$500,000.**

▲ **O., Middleburg Heights**—STORE—Halle Bros. Co., 1220 Euclid Ave., Cleveland, Zone 15, 2 story, brick suburban store in Pearl Rd.-W. 130 St. shopping center, **$3,000,000,** Raymond Loewy, 488 Madison Ave., New York, N. Y., will design bldg.

▲ **O., Parkview**—APARTMENTS—Modern Home Building Co., Barney Schwarzer, pres., 4373 Clague Rd. N., Olmsted, 12 apartments, along Brookpark Rd. **$1,000,000.**

▲ **O., Parkview**—HOMES—Modern Home Building Co., Barney Schwarzer, pres., 4373 Clague Rd. N., Olmsted, 70 homes, W. 226, 7, 8 and 229 Sts. off Maple Dr., **$1,400,000.**

▲ **O., Parma**—HOMES—Craft Builders, 18032 Euclid Ave., Cleveland, Zone 12, plans by Louis J. Rotman, 31715 Vine St., Wickliffe, 280 homes, W. 121 St. and Pleasant Valley Rds., **$4,500,000.** Construction to start late October.

▲ **O., Parma**—HOMES—D & R Constr. & Realty Co., David Moskowitz, pres., 4575 Pearl Rd., Cleveland, Zone 9, plans by Nathan Bernstein, 4618 Euclid Ave., Cleveland, Zone 3, 150 homes, W. 115 and Pleasant Valley Rds. **$2,700,000.**

▲ **O., Solon**—SHOPPING CENTER, etc.—Max Marmorstein, National City Bank Bldg., Cleveland, Zone 14, shopping center, incl. 20 stores and parking facilities, 70 homes, Miles and SOM Center Rds. **$3,750,000.**

▲ **O., Youngstown**—CATHEDRAL—Most Rev. Emmet M. Walsh, bishop Catholic Diocese, 144 W. Wood St., plans by Diehl & Diehl, 120 Madison St., Detroit, Mich. St. Columba Cathedral, W. Wood St. and Elm St. **$1,000,000.** CD 9/23/54.

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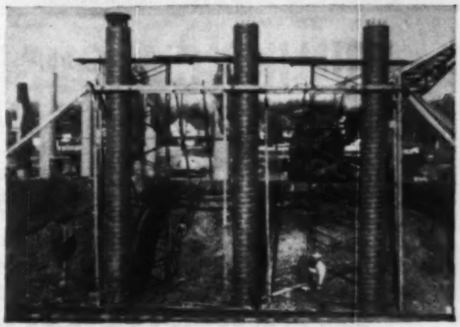

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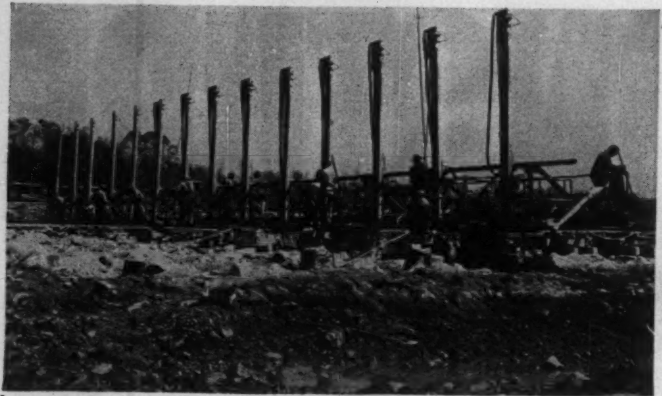

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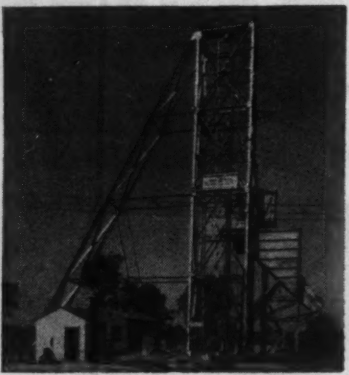

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AIR ENTRAINING AGENT

1. Liquid can be added to gauge water or introduced into mix
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6051 West 65th Street, Chicago, Illinois

▲ **R. I., East Providence**—SHOPPING CENTER—Syndicate, c/o Fred Podren, 143 Newbury St., Boston, Mass., plans by Sumner Schein, 271 Huntington Ave., Boston, Mass., shopping center, approx. 50 stores, roads, grading, etc., junction Pawtucket and Taunton Aves. **$4,000,000.** CD 6/30/53.

▲ **Tex., Austin**—APARTMENT-HOTEL—American Guaranty Underwriters, Inc., c/o Ben Medow, chn., 1010 Brazos St., plans by Fred Buford & Assocs., 326 Interurban Bldg., Dallas. 8 story, masonry apartment-hotel, **$1,500,000.**

▲ **Tex., Houston**—APARTMENT—Louis Cowan, 5201 Fannin St., plans by Wyatt C. Hedrick, consult. engr.-archt., 5201 Fannin St., 850-room brick exterior, terra cotta trim, concrete frame apartment, Hermann Dr. **$500,000.**

Wyo., Casper—OFFICE—Fred Goodstein, 1225 S. Center St., plans by J. Robert Bence & George Stein, 1733 Westridge Circle, 6 story L-shaped, 60,000 sq. ft. office bldg. **$750,000.**

▲ **Wyo., Cheyenne**—SHOPPING CENTER—City Center Shopping Center, 418 W. 7 St., shopping center, **$2,000,000.**

▲ **B. C., Vancouver**—SHOPPING CENTER—Woodward Stores Ltd., 101 W. Hastings St., plans by J. C. Page, 101 W. Hastings St., shopping center in South Cambie Street area, **$5,000,000.**

B. C., Vancouver—APARTMENT—Charles Glassman, 1280 W. Pender St., plans by G. Hamilton, 1280 W. Pender St., 6 story apartment. **$550,000.**

▲ **Ont., Toronto**—APARTMENT—Ennis Constr. Co., Ltd. 605 Briar Hill Ave., 10 story, 180-suite, masonry, steel, rein.-con. apartment, 66-74 St. George St. **$1,440,000.**

Ont., Toronto—APARTMENT—Sam Liebel & Wm. Engle, 12 Glen Cedar Rd., plans by Murray Sklar, 165 Spadina Ave., 7 story, bsmnt., 86-suite steel, brick apartment, 86 Charles St. E. **$608,000.**

▲ **Que., Beaconsfield**—SHOPPING CENTER—Anchor Enterprises Ltd., 137 Cartier Ave., Pointe Claire, plans by Ben-Ami Shulman, 5174 Cote des Neiges Rd., Montreal, shopping center, Elm Ave. **$1,000,000.** CD 2/17.

▲ **Que., Montreal**—STORE—T. Eaton Co. Ltd., 677 St. Catherine St. W., plans by Gratton D. Thompson, 1241 Guy St., large extension of downtown department store, **$5,000,000.** Wiggs, Walford, Frost & Lindsay, 350 Sherbrooke St. W., consult. engrs.

▲ **Que., Montreal** — OFFICE — Isadore Feldman, 1396 Notre Dame St. W., plans by Greenspoon, Freedlander & Dunne, 4151 Sherbrooke St. W., 20 story office bldg., Dorchester St. W. and Drummond St. **$4,000,000.** Bids soon.

▲ **Que., Montreal**—CULTURAL CENTER—Slovak Community Center, c/o Steve Sura, 40 Morrison Ave., Town of Mount Royal, Montreal, cultural center, Dorocher and Jean Talon Sts. **$1,000,000.**

▲ **Que. Quebec City**—APARTMENT—Moise Darabaner, 213 Charest Blvd., 10 story, 129-suite apartment, Grand Allee, **$1,000,000.**

INDUSTRIAL BUILDINGS

Calif., Santa Susana — PRODUCTION FACILITY — Air Products, Inc., 4949 Hollywood Blvd., Los Angeles, plans by Daniel, Mann, Johnson & Mendenhall, 4201 Sunset Blvd., Los Angeles, liquid oxygen production facility. **$750,000.**

▲ **Iowa, Cedar Rapids**—POWER PLANT—Central Iowa Power Co-operative, 219½ 3 Ave. S. W., power plant, **$6,892,000.**

▲ **O., Shelby** — PLANT — Copperweld Steel Co., 37 Tiefeld St., Glassport, plant addn. at seamless tube plant, **$1,000,000.**

▲ **O., Warren**—PLANT—Copperweld Steel Co., 37 Teifeld St., Glassport, steel plant addn., incl. electric furnaces and primary mill with pits for heating steel. **$10,000,000.** CD 2/29/52.

▲ **Pa., Altoona**—PLANT—Veeder-Root, Inc., 25 Sargent St., Hartford 2, Conn., plant to mfg. computers, **$1,500,000.** Ford, Bacon & Davis, 39 Broadway, New York, N. Y., consult. engrs.

▲ **Pa., Glassport**—PLANT—Copperweld Steel Co., 37 Tiefeld St., Glassport, plant addn. at Cable and Wire Div. **$1,000,000.**

UNCLASSIFIED

▲ **Ga., Commerce**—PLANT—O. E. Szekely & Assocs., 5312 Westminister Ave., Phila., Pa., radar plant, **$1,000,000.**

▲ **Missouri** — RURAL DISTRIBUTION LINES — Laclede Electric Co-operative, Lebanon, imprvs., extens. to rural distr. lines in Laclede, Webster and Wright Counties, **$1,362,000.**

▲ **N. Y., New York**—MARGINAL WHARF—Dpt. Marine & Aviation, Pier A, North River, marginal wharf from Coenties Slip to old slip, East River, **$10,000,000.** Tippetts-Abbett-McCarthy-Stratton, 62 W. 47 St., Zone 19, engrs. CD 9/9.

▲ **O., Cleveland**—STADIUM, etc.—City, City Hall, Zone 14, stadium, **$3,500,000-$6,000,000**; swimming pool with seating facilities for 20,000, **$750,000.**

▲ **O., Warrensville Heights**—LABORATORY—Standard Oil Co., of Ohio, Midland Bldg., Cleveland, Zone 15, plans by Ralph Fletcher, Chagrin Falls, research laboratory on 84 acre site on Warrensville Center Rd., **$2,000,000-$3,000,000.** H. K. Ferguson Co., 1783 E. 11 St., Cleveland, Zone 14, consult. engrs. **Bids in November or December. Constr. will start in Spring.**

▲ **B. C. Chilliwack**—PLANT—Alfred B. McCorkie, Jr., Boston Bar, B. C., veneer plant. **$1,500,000.**

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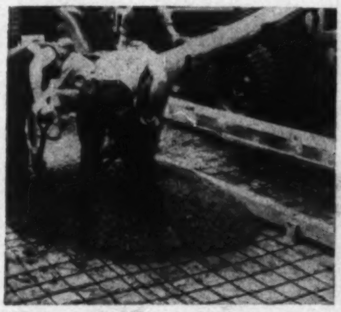

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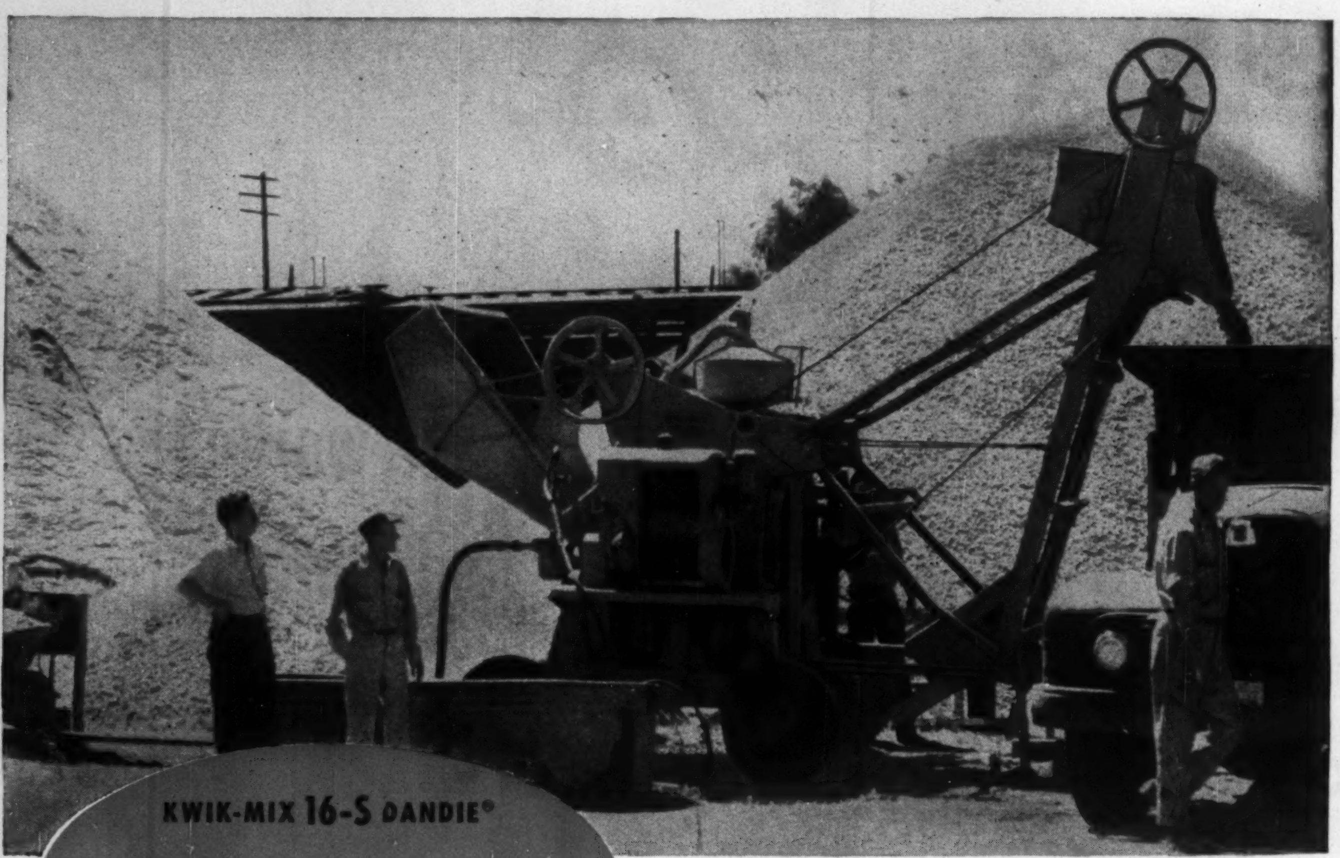

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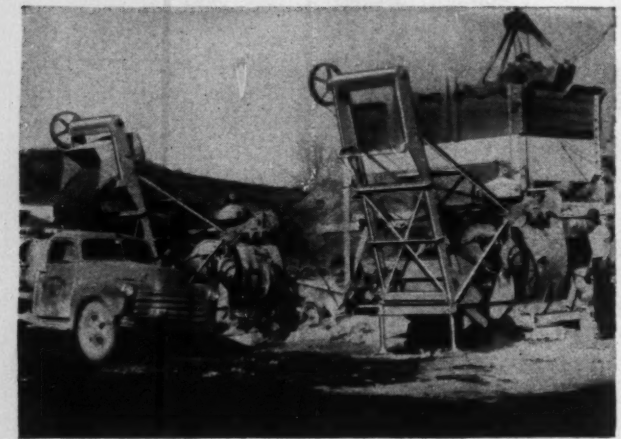
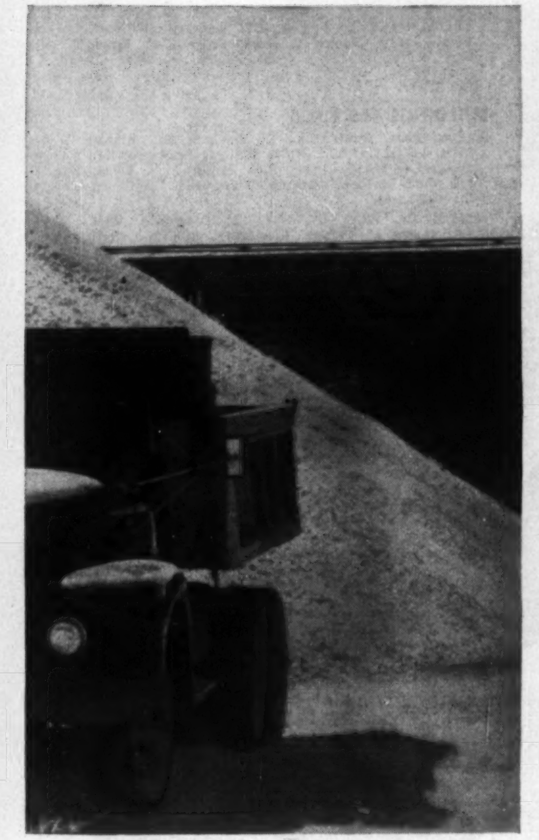
LOADS TRUCKS — Producing concrete for curbs and gutters, a Kwik-Mix 16-S Dandie mixer dumps batch directly into truck from ground level. Tower loader attachment gives 9 foot-2 inch discharge height. Big-capacity bucket holds full 17.6 cu. ft. mixer batch. It is powered by the mixer engine, dumps automatically at top of tower. Bucket travel and discharge are completed while the next batch is being



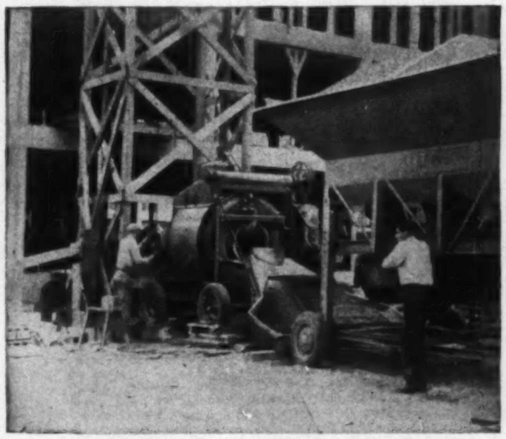
SETS UP AS CENTRAL-MIX PLANT — on bridge construction, two Kwik-Mix 16-S Dandie concrete mixers, with wheels removed, were set up side-by-side as permanent mix plants. Both were equipped with tower attachment for truck-loading operation. These big-capacity mixers also can be set up as stationary plants on elevated platforms by adding an extension track to charge the drum.

LOADS CONCRETE BUCKETS — Working on a state highway relocation project, this mobile 16-S Dandie mixed concrete for a series of box culverts — discharged batch into concrete bucket. To suit operating conditions, this versatile Kwik-Mix 16-S mixer is adaptable to side or end discharge. Axles are readily interchangeable on the square mixer frame. Change-over is easy, takes less than an hour.

KWIK-MIX COMPANY, Milwaukee 16, Wis. (Koehring Subsidiary) CKM536



mixed. There's no delay to mixer production. Tower is easily attached. Top section is hinged, folds back for ample travel clearance. Tower loader attachment is also available on the 11-S Dandie concrete mixer, and on Kwik-Mix 10 and 14 cu. ft. bituminous mixers.



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With 30 digging feeds, this cross-country 215 Trenchliner digs 6 in. to 18 feet per min., 13 to 31 in. wide, up to 6 ft. deep. Square or round-bottom buckets have "easy-in, easy-out" Tap-In teeth. Standard tractor-type crawlers have 18-in. treads, lug-type shoes. Other Parsons Trenchliners: wheel-type 202 for drainage and utility work; 3 ladder-types, full crawler mounted; and the mobile, utility size rubber-tired Trenchmobile®.

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Bids—Low Bids—Contracts—Second Section

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STREETS AND ROADS
October 3 Connecticut October 4 Massachusetts

▲† **Me., Bangor**—AIRFIELD PAVEMENTS—BA 10/13—U. S. Eng., 857 Commonwealth Ave., Boston, Mass., airfield pavements runway taxiway lighting, Dow Air Force Base, ENG.-19-016-56-24, $6,000,000. Plans deposit $25, refundable. Seelye, Stevenson, Value & Knecht, 101 Park Ave., New York, N. Y., engrs. CD 9/12.

BUILDINGS—BA

Mass., Lexington—SCHOOL—BA 10/11—Town, 1475 Mass. Ave., high school addn., Waltham St. $925,000. Plans deposit $50, refundable, Perry, Shaw & Hepburn & Dean, 31 St. James Ave., Boston, archts. CD 11/4/48.

BUILDINGS—SLC

Mass., Brockton—BUILDING—West Fair Realty, 157 Main St., soon lets contract 200x300 ft. bldg., Belmont St. $500,000, Engineering Services, Inc., 844 Stevens Ave., Portland, Me., engr.-archt. Sears, Roebuck & Co., 201 Brookline Ave., Boston, Mass., lessee.

HEAVY CONSTRUCTION—LB & CA

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

Mass.—**The Savin Constr. Corp.**, 10 Village St., East Hartford, Conn. LB **$7,401,331.** hy. and bridge Southeast Expressway, Dorchester;

Mass.—**J. F. White Constr. Co.**, 201 Alewife Brook Parkway, Cambridge, Mass. LB **$1,533,404.** hy. and brick Southern Circumferential Hy., Proj. U 229 (10), Canton. Bids Sept. 20. CD 9/12 and 8/31.

▲† **The Lane Constr. Corp.**, 965 E. Main St., Meriden, Conn., LB **$1,422,230**, est. $2,000,000. operational parking apron, plane wash disposal plant, Westover Air Force Base, ENG.-19-016-56-21, CHICOPEE FALLS, MASS. U. S. Eng., 857 Commonwealth Ave., Boston, Mass. Fenton G. Keyes Assoc., 267 Moody St., Waltham, Mass., archts. Haley & Ward, 73 Tremont St., Boston, Mass., engrs. Bids Sept. 16. CD 8/17.

BUILDINGS—LB & CA

▲ **Rugo Bros. Constr. Co.**, 80 Boylston St., Boston, Mass. LB **$1,533,000.** HIGH SCHOOL, Shawsheen Rd., ENDOVER, MASS. Town, High School Bldg. Comn., c/o Supt. Schools, Andover, Mass. Bids Sept. 15. CD 8/29.

Vappi & Co., Inc., 240 Sidney St., Cambridge, Mass. CA Approx. **$779,666.** Elementary SCHOOL, North Union and Everett Sts., East Arlington, ARLINGTON, MASS. Town, School Dpt., 23 Maple St., Arlington, Mass. CD 9/8, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
October 4 Maryland October 11 Delaware
STREETS AND ROADS
October 11 Delaware

BUILDINGS—BA

N. Y., New York—LAUNDRY—Bids Asked—Thomskil Realty Corp., 350 Gerard Ave., Zone 51, altering 4 story laundry, 344 Gerard Ave. $500,000, Charles Abrahams, 767 Lexington Ave., Zone 21, archt. CD 7/19.

HEAVY CONSTRUCTION—LB & CA

▲ **Lehigh Structural Steel Co.**, 17 Battery Place, New York 4, N. Y. LB **$1,004,190.** furnishing, fabrication, erecting structural steel for Kent Avenue Power Plant, Contr. P-127, NEW YORK. New York City Transit Auth., 370 Jay St., Brooklyn 1, N. Y. Bids Sept. 16. CD 9/6.

▲ **P. J. Carlin Constr. Co., Thomas Crimmins Contg. Co.**, and **Atlas Tile & Marble Works, Inc.**, 209 W. 38 St., New York 1, N. Y. LB **$1,478,945** (3 bidders) alterations, demolition, excavation and foundations for Kent Avenue Power Plant, New York City Transit Sys., Contr. P-126, NEW YORK. New York City Transit Auth., 370 Jay St., Brooklyn 1, N. Y. Bids Sept. 16. CD 8/24.

Wortmann & Sons, Inc., 109 E. 29 St., New York 16, N. Y. LB **$218,291.** (9 bidders) Contr. NYA 690.003 garage, foam pump house, masonry wall at New York International Airport, IDLEWILD, N. Y. Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. Bids Sept. 20. CD 9/14.

Tufano Constr. Corp., 32-17 Lawrence St., Flushing 6, N. Y. LB **$162,000.** (5 bidders) Contr. NYA-690.002 pavements and utilities and landscaping for fuel trucks parking facility at New York International Airport, IDLEWILD, N. Y. Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. Bids Sept. 20. CD 9/14.

▲ **Rao Electrical Equipment Co., Inc.**, and **Arc Electrical Constr. Co., Inc.**, 314 E. 39 St., New York 16, N. Y. (3 bidders) LB **$2,123,000.** cable equip. and duct constr., Pelham Bay Line, IRT, Contr. P-99, NEW YORK, N. Y. New York City Transit Auth., 370 Jay St., Brooklyn 1, N. Y. Bids Sept. 16. CD 8/24.

† **Michael Contg. Co.**, 142 19 St., Brooklyn 32, N. Y. LB **$745,570.** (4 bidders) Special AAA Facilities, Cambria, NEW YORK. U. S. Eng., 111 E. 16 St., New York 3, N. Y. Bids Sept. 21. CD 9/9.

M. A. Bongiovanni, 309 Sunset Ave., Syracuse, N. Y. LB **$818,755.** sewers, SYRACUSE, N. Y. Onondaga P. Wks. Comn., Robt. W. Sollinger, purch. agt., Court House, Syracuse 2, N. Y. Bids Sept. 21. CD 8/29.

▲ **NEW JERSEY and PENNSYLVANIA**—Delaware River Port Auth., Administration Bldg., Bridge Plaza, Camden, N. J.,

Kaufman Constr. Co., Inc., 4000 Pulaski Ave., Phila., Pa., CA **$2,361,234.** Contract P-7, Walt Whitman Bridge-Phila. approaches, roadway grading, drainage 28 St. and Vare Ave. to Moyamensing Ave. and separation structures and City Street changes at Moyamensing and Passyunk Aves. for new bridge between Packer Ave., Phila., Pa. and Gloucester, N. J. Bids Sept. 15. CD 8/22.

NEW JERSEY—New Jersey Turnpike Auth., Administration Bldg., New Brunswick,

Louis Zimmerman, Jr., 278 Hillside Ave., Hillside, N. J., CA, **$624,045.** Contract 114, grading, drainage, paving Elizabeth Interchange, Maintenance Area No. 5, Service Area 11N and the Jersey City Interchange on N. J. Turnpike, Union and Essex Counties. Awarded Sept. 14. CD 9/15, under LB.

▲ **PENNSYLVANIA**—Pennsylvania Turnpike Comn., 11 N. Fourth St., Harrisburg,

Ryan Brothers, Inc., Clearfield, Pa. CA **$1,097,861.** constr. 0.57 mi. (Sec. 37N) of northeastern extension in Abington Twp., Lackawanna Co. Bids Aug. 24. CD 8/26, under LB.

▲ **Rogers Constr. Co.**, R. D. Bell Mountain, Scranton, Pa. CA **$1,277,695.** Section 37K (south); CA **$1,060,650.** Section 37 K (north) and Section 37 L slushing mine areas on northeastern extension, PENNSYLVANIA. Pennsylvania Turnpike Comn., 11 N. Fourth St., Harrisburg, Pa. CD 8/12, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 N. Office Bldg., Harrisburg,

Allegheny Contg. Industries, Inc., 801 Bingham St., Pittsburgh 3, Pa. CA **$693,352.** constr. 21,792 ft.

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crushed aggregate base with bit. surf. 22 ft. wide, LR. 17068 (3)-17069 (1), Clearfield Co. Bids Sept. 9, awarded Sept. 16. CD 9/14, under LB.

Highway Constr. Co., P. O. Box 4437, Wash. 17, D. C., LB **$125,976,** widening and paving roadway of "L" St. N. W. 12 to 15 Sts., WASH., D. C. D. C. Govt., Dpt. of Hys., 499 Pa. Ave. N. W. Wash., D. C. Bids Sept. 20.

BUILDINGS—LB & CA

Matson Ridge Homes, c/o N. M. Obedin Co., 124 Jackson St. Hempstead, N. Y. Owner Builds. **$400,000.** 40 HOUSES on tract at Rte. 27, BELLPORT, N. Y.

Cherrywood Homes, c/o Trylon Realty Co., 98-89 Queens Blvd., Forest Hills, N. Y. Owner Builds. **$850,000.** 50 HOUSES on tract on Old Bethpage Rd., BETHPAGE, N. Y.

▲ **Lord Chesterfield Homes,** c/o Albert B. Meklenburg Org., 1038 Northern Blvd., Roslyn, N. Y. Owner Builds. **$3,000,000.** 300 HOUSES on tract at Suffolk Ave. and Willoughby St., BRENTWOOD, N. Y.

▲ **Alexander Muss & Sons,** Grohman's Lane, Plainview, N. Y. Owner Builds. **$10,000,000.** 1,000 HOUSES and SHOPPING CENTER on 350 acre tract on Montauk Hy., ISLIP, N. Y.

▲ **Ryan Contg. Co.,** 341 E. 79 St., New York 21, N. Y. CA Est. **$1,000,000.** 3 story PAROCHIAL SCHOOL and RESIDENCE for brothers, 1992-2024 Flatbush Ave., BROOKLYN, N. Y. R. C. Parish of St. Thomas Aquinas, 1550 Hendérickson St., Brooklyn, N. Y. Bids Aug. 4. CD 7/26.

▲ **Benderson Development Co.,** 126 Franklin St., Buffalo, N. Y. Owner Builds. **$1,000,000.** 4 story HOTEL, Main and W. Tupper Sts., BUFFALO, N. Y.

Blackstone Arms, Inc., c/o Schulman & Soloway, archts., 100-15 Queens Blvd., Forest Hills, N. Y. Owner Builds. **$500,000.** 8 story APARTMENT, 89 Ave. and 168 St., JAMAICA, N. Y. CD 6/22.

Cuzzi Bros. & Singer, Inc., 160 E. 56 St., New York 22, N. Y. CA Est. **$350,000.** CONVENT and SCHOOL addn., Hone Ave., NEW YORK, N. Y. St. Clare's School, 1911 Hone Ave., New York 61, N. Y. Starrett & Van Vleck, 267 Fifth Ave., New York 16, N. Y., archts.

▲ **176 E. 77 St. Corp.,** 654 Madison Ave., New York 21, N. Y. Separate Contracts. **$2,000,000** 17 story APARTMENT, 1334-1344 Third Ave., southwest corner of 77 St., NEW YORK, N. Y. CD 6/17.

▲ **Rheinstein Constr. Co., Inc.,** 21 E. 40 St., New York 17, N. Y. CA Est. **$1,750,000.** 10 story BUILDING addn., Lexington Ave. and Sixth St., NEW YORK, N. Y. Associated Hospital Service, 80 Lexington Ave., New York, N. Y. CD 5/19/54.

▲ **Samuel Friedenberg & Son,** 161 William St., New York 7, N. Y. Separate Contracts. **$2,000,000.** 25 story OFFICE, 120 Williams St., and 79 John St., NEW YORK, N. Y. CD 4/6.

▲ **Lasker-Goldman Corp.,** 50 E. 42 St., New York 17, N. Y. LB **$1,767,000.** (11 bidders) general constr. LIBRARY of City College, South Campus (Manhattanville) NEW YORK, N. Y. Bd. Higher Educ., the City College Business Office, Brett Hall, 136 St. and Convent Ave., New York 31, N. Y. Bids Sept. 20, CD 8/9;
A. I. Smith, 1518 East New York Ave., Brooklyn 12, N. Y. LB **$344,783.** (10 bidders), electrical work (New York, N. Y.).

▲ **Morton C. Tuttle Co.,** 862 Park Square Bldg., Boston, Mass. CA Est. **$1,500,000.** 2 story OFFICE, Tenth Ave., WATERVLIET, N. Y. Behr-Manning Corp., 1933 Sidford St., Troy, N. Y. K. H. Ripnen Co., Inc., 440 Fourth Ave., New York 16, N. Y., archt.

▲ **J. J. Secoles, Inc.,** 274 Madison Ave., New York 16, N. Y. CA Est. **$3,500,000.** DEPARTMENT STORE, on 4 acre site bounded by Post Rd., South Broadway and Maple Ave., WHITE PLAINS, N. Y. Alexander's Department Store, Inc., Fordham Rd. and Grand Concourse, New York, N. Y. Ketchum, Gina & Sharpe, 227 E. 44 St., New York 17, N. Y., archts. CD 5/1/53.

Kingsland Estates Homes, c/o Peter R. Barna Agency, 1128 Main Ave., Clifton, N. J. Owner Buillds. **$760,000.** 45 HOUSES, BOONTON, N. J.

▲ **Max Drill, Inc.,** 60 Park Place, Newark, N. J., CA **$1,000,000.** 3 story LABORATORY, NEWARK, N. J. Beth Israel Hospital, 201 Lyons Ave., Newark, N. J. Kelly & Gruzen, 744 Broadway, Newark, N. J., archts.

E. B. Brown & Sons, Essex Falls, N. J., CA **$420,000.** CHURCH, SHORT HILLS, N.J. Community Congregational Church, c/o Ferrerz & Taylor, archts., 152 W. 42 St., New York 36, N. Y.

▲ **Becker Constr. Co.,** 361 Grove St., Newark, N. J., CA **$1,000,000.** FACTORY, Morris Ave., UNION, N. J. Schering Corp., Bloomfield Ave. and Broad St., Bloomfield, N. J. Frank Grad & Sons, 11 Commerce St., Newark, N. J., archts.

▲ **L. D. Building Co.,** Latrobe, Pa. LB **$1,794,000.** general contract ADMINISTRATION BLDG., HIGHSPIRE, PENNSYLVANIA. Pennsylvania Turnpike Comn., North Office Bldg., Harrisburg, Pa. Bids Sept. 20. CD 8/30;
Howard P. Foley Co., 312 Revere St., Harrisburg, Pa. LB **$344,400.** electrical work (Pennsylvania).

Mooney Bros., 133 Mahoning Ave., New Castle, Pa. CA Est. **$500,000.** 1 story, 140x180 ft., steel self-service SUPERMARKET, NEW CASTLE, PA. Joseph's Market, 13 E. Long Ave., New Castle, Pa. CD 6/30.

George H. Chilli Co., 805 Ann St., Homestead, Pa. CA Est. **$400,000.** 2 story, bsmnt., brick, block fraternity DORMITORY, PITTSBURGH, PA. Carnegie Institute of Technology, Schenley Park, Pittsburgh, Pa. Laurence

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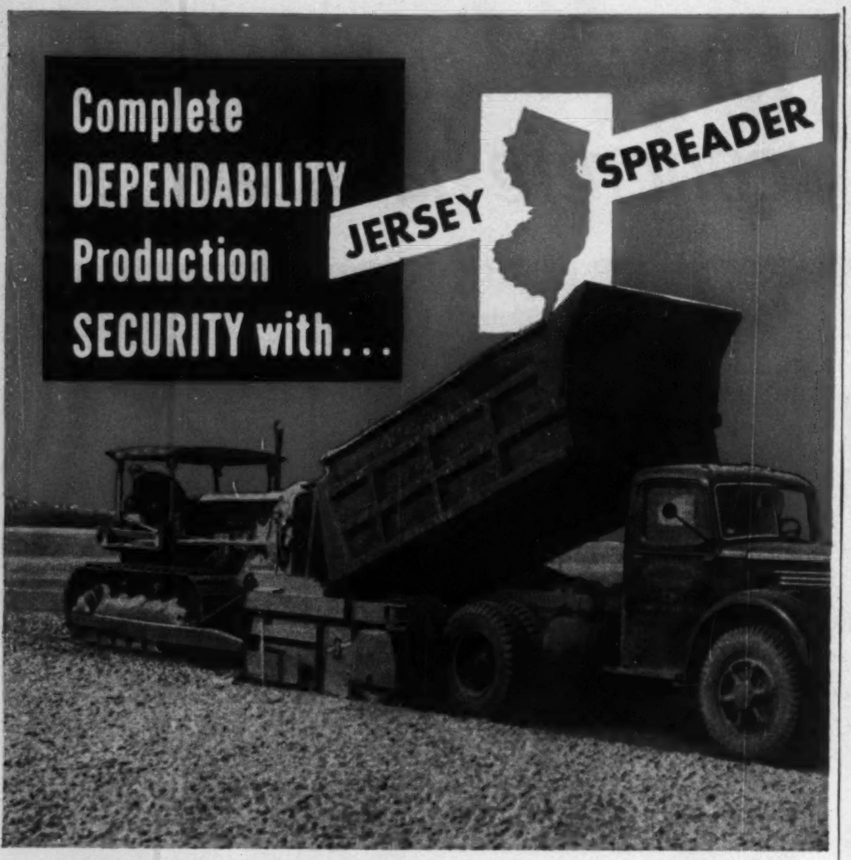

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Wolfe, 119 E. Montgomery St., Pittsburgh, Pa., archt. CD 11/3.

Ferraro Constr. Co., 523 N. Homewood St., Pittsburgh, Pa. CA Est. **$400,000.** 2 story, 50x174 ft., stone, steel Parochial SCHOOL, Brecelyn and Eymard Sts., PITTSBURGH, PA. Our Lady of Blessed Sacrament Church, c/o Marlier & Johnstone, archts., Empire Bldg., Pittsburgh, Pa. Bids Sept. 1. CD 8/29.

W. R. **Konkle**, 500 Wildwood Ave., Verona, Pa. CA 1 story, 80x700 ft., steel girder SHOP, VERONA, PA. Total est. **$500,000.** Ingalls Iron Works, Verona, Pa. J. Fred Treggo, 5777 Broad St., Pittsburgh, Pa., engr., CD 7/22;
O. H. Martin, 18 First St., Sharpsburg, Pa. CA 1 story, 80x220 ft., steel, L-shaped loading dock (Verona, Pa.).

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
October 12, November 16 Louisiana
STREETS AND ROADS
October 12, 26 Louisiana

BUILDINGS—BA

▲ **Fla., Tampa**—HOSPITAL—BA 10/27—Curtis Hixon, mayor and Bd. Representatives, City Hall, Tampa Municipal Hospital addns., alterations, Davis Islands. $3,980,691. Plans deposit $100. Norman F. Six, Hillsboro Hotel, Tampa, Eliot C. Fletcher, 404 Marion St., Tampa, and Schmidt, Garden & Erikson, 104 S. Michigan Ave., Chicago 3, Ill., archts. CD 4/28/53.

▲ **La., New Orleans**—SCHOOL—BA 10/27—Orleans Parish School Bd., 703 Carondelet St., masonry, steel 104,000 sq. ft. Kohn Junior High School, 1800 and 1900 blocks of Bartholomew St. $1,227,624. Plans deposit $100. Freret & Wolf, 630 Gravier St., archts.

Ala., Birmingham—LIBRARY—Bids Asked—Howard College, 7725 Second Ave. S., 3 story, bsmnt, concrete, steel, brick library. $500,000. Van Keuren, Davis & Co., 3004 7 St. S., archts. CD 3/16.

HEAVY CONSTRUCTION—LB & CA

▲ **SOUTH CAROLINA**—State Hy. Dpt., Hotel Jefferson, Columbia,
McMeekin Constr. Co., P. O. Box 352, Cheraw, S. C., CA **$1,922,733**, bridge work, S. C. Docket No. 7.238.4, F. A. Proj. No. F-2534 (5), Beaufort Co. Bids Aug. 18. CD 8/23, under LB.

SOUTH CAROLINA—State Hy. Dpt., Hotel Jefferson, Columbia,
Peden Constr. Co., Inc., Box 1836, Greenville, S. C. CA **$810,129**, road work, S. C. Docket No. 4.435. F. A. Proj. No. F-2600 (1) Part 2, Anderson Co. Bids Aug. 18. CD 8/24, under LB.
FLORIDA—State Road Dpt., Tallahassee,
Powell Bros. Inc., Box 281, Fort Lauderdale, Fla., CA **$730,673.** maint. traffic, removal of existing structures, embankment, rock base with surf. b. conc., bridge, bridge items, 0.447 mi. State Road 810, Bridge and approaches over Intracoastal Waterway between Kester Blvd. in Deerfield Beach and SR A1A Job 8612-175, Brevard Co. Bids May 31, awarded Sept. 15. CD 6/6, under LB.
▲ **FLORIDA**—State Road Dpt., Tallahassee,
Fla.—**White Constr. Co.**, Box 126, Williston, Fla., CA, **$1,208,938.** heavy excav., stab. roadbed, rock base with b. conc., resurf. existing pavement with b. conc., 177 ft. overpass bridge and wid'n. existing overpass bridge over FEC railroad south of Oak Hill; 180 ft. concrete slab bridge on concrete piling, small drainage structures 13.612 mi. State Road 5 F 003-6 (7), Job 7901-275, Volusia Co.;
Fla.—**Smith Eng. & Constr. Co.**, Drawer 1831, Pensacola, Fla., CA, **$749,502.** heavy excav., sand-clay base, with bit., and sand-clay base with b. conc. storm sewers, curb, gutters, sidewalk, 2 concrete, steel hy. overpass bridges, 145 ft. and 218 ft. underpass bridge at Seaboard Air Line R. R. Crossing 1.77 mi. State Road 20, U 016-2 (13), UG-016-2 (11) and F 016-2 (12), Jobs 5508-204, 5508-301 and 5508-205, Leon Co. Bids Aug. 30, awarded Sept. 16. CD 9/2, under LB.
† **W. T. Price Dredging Corp.**, 3200 S.W. 27 Ave., Miami, Fla., CA, **$794,750.** Levee 20, North New River Canal, Central and Southern Florida Flood Control Proj. CIVENG-08-123-56-3, FLORIDA. U. S. Eng., P.O. Box 4970, Jacksonville, Fla. Bids Aug. 25. CD 7/21.
† **Moss Constr. Co.**, 822 12 St., Columbus, Ga., CA, **$933,547** non-overflow earth dike at Fort Gaines Lock & Dam, Chattahoochee River, CIVENG-01-076-56-1, ALABAMA and GEORGIA. U. S. Eng., 2301 Grant St., Mobile, Ala. Bids Sept. 13. CD 9/20, under LB.
† **McWilliams Dredging Co.**, 903 S. Jefferson Davis Parkway, New Orleans, La. LB **$759,792.** (6 bidders) Blind Tensas Cut and Upper Grand River Channel dredging, involving 5,280,000 cu. yd., St. Martin and Iberville Parishes, Inv. 56-31, LOUISIANA. U. S. Eng., foot of Prytania St., New Orleans, La. Bids Sept. 15. CD 8/29.
▲† **Guy F. Atkinson Co.**, 10 W. Orange Ave. S., San Francisco, Calif. and **United Constr. Co.**, 64 W. Fifth St., Winona, Minn. CA Est. **$14,603,317.** (jointly). Greenup Locks, KENTUCKY. U. S. Eng., 237 Fourth Ave., Huntington 18, W. Va. Bids Sept. 15, awarded Sept. 16. CD 7/26.

BUILDINGS—LB & CA

▲ **E. H. Scott & Sons**, Box 946, Americus, Ga., LB, **$1,150,260.** Martin Elementary SCHOOL (colored); Helen Gurr Elementary SCHOOL (colored); Dunbar Elementary SCHOOL (colored); Northside Elementary SCHOOL (colored); County Colored High SCHOOL;

(Continued on page 360)

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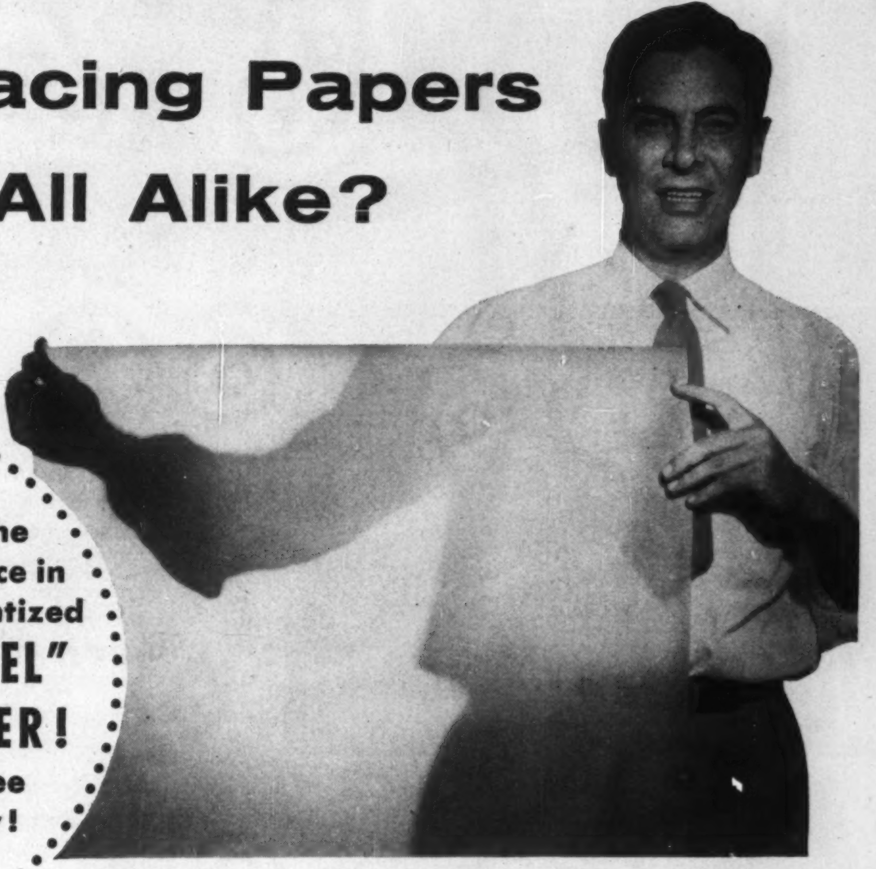

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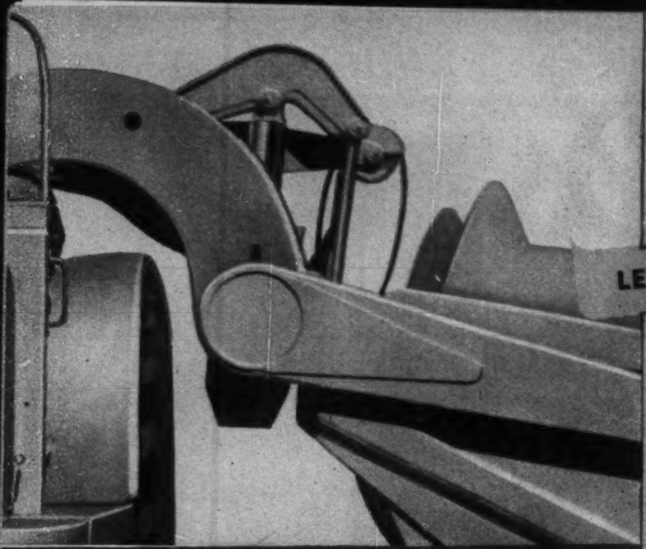

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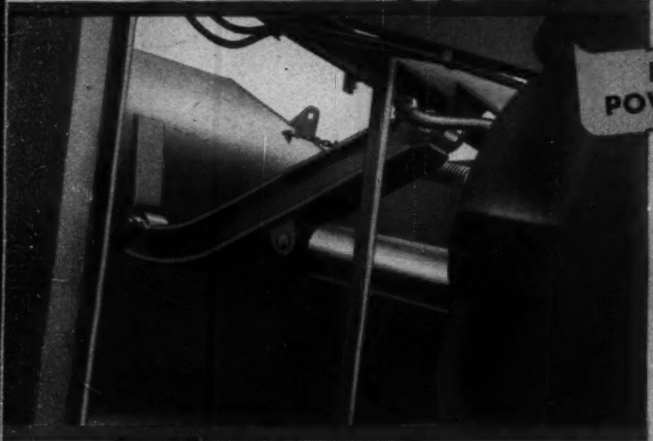

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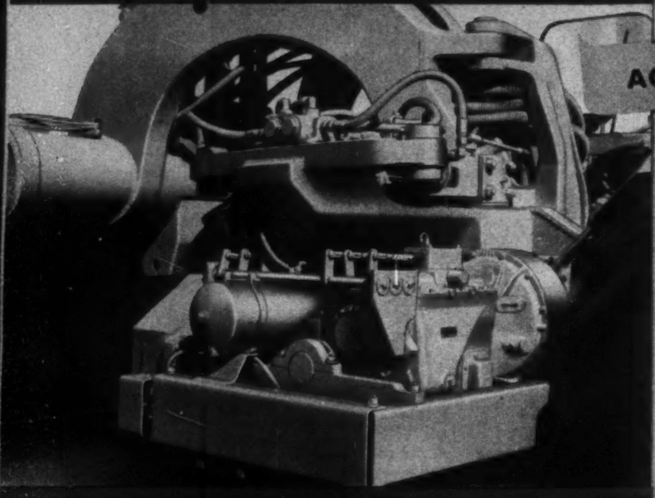

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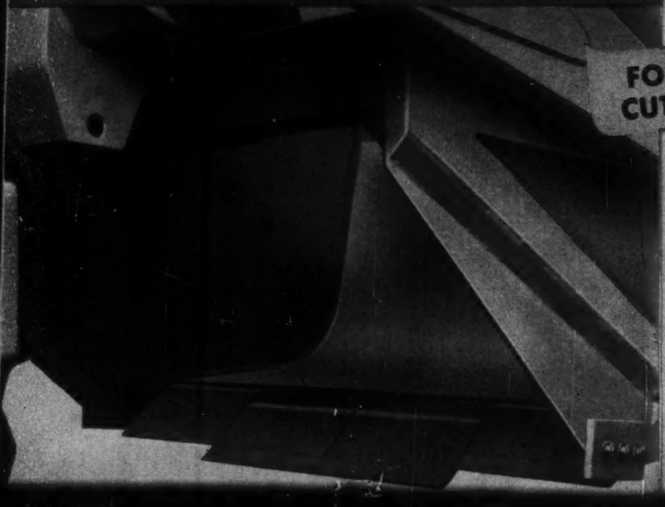
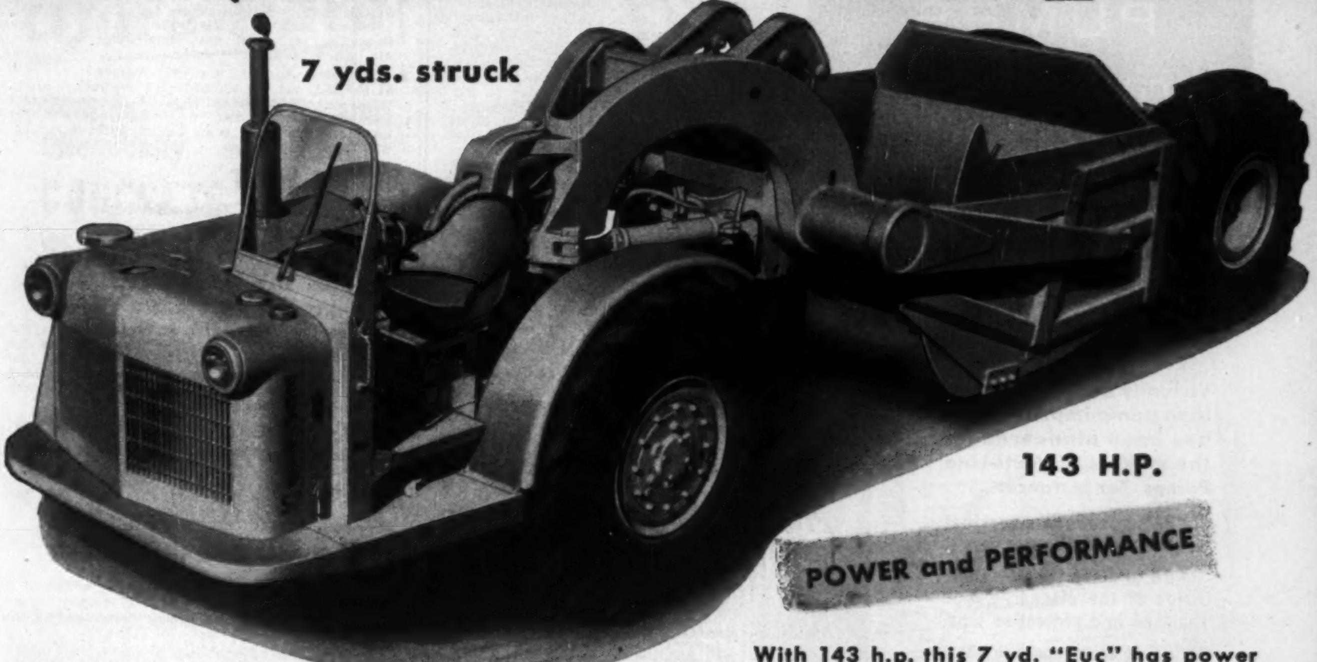


FOUR SECTION CUTTING BLADE

A four section cutting blade provides most efficient loading in any material. Each section is reversible and interchangeable to give longer life and permit the straight or drop center blade arrangements best suited for job requirements. A new cutting edge for any blade arrangement can be obtained by simply reversing or interchanging the sections.

S-7 "Euc" Scraper



POWER and PERFORMANCE

With 143 h.p. this 7 yd. "Euc" has power and performance that's unequalled in small scrapers. . . 20 h.p. for every yard of capacity . . . 18.00 x 25 tires . . . and a top speed of 25 m.p.h. with full payload.

This "Euc" S-7 is the newest addition to Euclid's Scraper line—fastest growing line in the industry because of customer acceptance and preference. It incorporates many of the features that have made larger Euclid Scrapers tops in production and efficiency . . . and has greater accessibility than any previous "overhung" scraper on the market.

Built to Euclid's standards of rugged construction for long service life, the S-7 is engineered throughout for good accessibility of all major components, for fast loading and travel, and for ease of operation. The entire power train—engine, clutch, transmission, planetary drive axle, etc.—is easy to get at for servicing, repair or replacement. This is a mighty important cost cutting feature in a single axle prime mover.

Before you buy your next small scraper, check the profit making features of the S-7. Your Euclid dealer can show you how this new "Euc" can get more work done at lower cost than any other scraper of comparable size.

MANEUVERABILITY

Maneuverability—so important for close quarter work—is excellent with the S-7. Full power steering and hitch design of the two-wheel tractor provides a 29 ft. non-stop turning radius. The 18.00 x 25 or 21.00 x 25 (optional) tires have large rolling radius for good traction and flotation.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

EUCLID

Euclid Equipment

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GENERAL MOTORS

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Virtually every major turbine pump improvement has been pioneered by the makers of Verti-Line Pumps. For instance:

first to produce a vertical pump for small diameter casing.

first to place the line shaft inside of the discharge pipe enclosed in a protective tube.

first to introduce line shaft lubrication from surface of ground.

first to introduce a full-floating ball thrust bearing head.

first to design high efficiency enclosed impellers.

first to introduce factory practices to insure proper shaft alignment.

first to introduce and pioneer the hollow-shaft motor head.

first to adopt the streamlined, weatherproof, built-in motor.

first to employ highly technical methods for statically and dynamically balancing rotating parts.

LAYNE & BOWLER will continue to be FIRST in presentation of improvements.

in all industry

on the farm

for the city

More than 100,000 satisfied vertical pump users agree there's no pump like Verti-Line for low first cost, economical operation, and negligible maintenance. Whatever your vertical pump needs may be, it will pay you to investigate Verti-Line before you buy.

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St.

(Continued from page 356)

mechanical alterations to Brownwood Elementary, Graves Elementary, Parrott Elementary and Sasser Elementary SCHOOLS; Dawson Elementary and Terrell High SCHOOL addns., DAWSON, GA. Georgia School Bldg. Auth., 41 Exchange Pl. S. E., Atlanta, Ga. Bids Sept. 20. CD 8/16.

▲ **Adams & Baker and N. C. Morgan Constr. Co.**, First National Bank Bldg., Tuscaloosa, Ala., CA, **$1,175,000.** 150-room HOTEL, TUSCALOOSA, ALA. Tuscaloosa Hotel Co., Inc., First Natl. Bank Bldg., Tuscaloosa, Ala. CD 9/21/53.

▲ **R. J. Jones & Sons**, Box 991, Alexandria, La. LB **$1,167,503**, est. $1,500,000. (12 bidders) 2 story, steel, masonry ENGINEERING BLDG. for Southwestern Louisiana Institute, Proj. E 3 SLJ-1, LAFAYETTE, LA. State Bldg. Auth., State Capitol, Baton Rouge, La. Bids Sept. 13. CD 8/9.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

October 11, 19 Ohio
October 11, 19 Ohio
October 11 Wisconsin
October 11 Wisconsin

BUILDINGS—BA

▲ **O., Cincinnati**—SHOPPING CENTER—BA 11/1—Walter Crothers, 7911 Reading Rd., (selected list bidders), Brentwood Shopping Center, Winton Rd. and Hempstead Dr. $2,000,000. Cordes, Pressler, Houch & Assoc., 4939 Paddock St., archts. Beineke & Ruehlmann, 626 Broadway, engrs.

BUILDINGS—SLC

O., University Heights—CHURCH—Catholic Diocese of Cleveland, 1027 Superior Ave., Cleveland, Zone 14, soon lets contract Gesu Church, $500,000. John E. Miller, Hanna Bldg., Cleveland, Zone 15, archt. Barber & Magee, 1900 Euclid Bldg., Cleveland, Zone 15, engrs. CD 8/16.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—State Hy. Dpt., Columbus, Zone 15,
Geo W. Lathrop & Sons, 1510 Montcalm St., Toledo, O. LB **$2,279,496**, est. $2,498,000. (7 bidders) constr. 4 mi. Toledo Expressway between Front and the city limits, Lucas Co. Bids Sept. 13. CD 8/25.

▲ **OHIO**—State Hy. Dpt., Columbus, Zone 15,

O.—**The Great Lakes Constr. Co.**, Box 2278, Brooklyn Station, Cleveland, O. LB **$287,983**, est. $308,100. (5 bidders) Type T-35 and structures 2.03 mi., SR 87-10.55, S-9 (9), Geauga Co.;

O.—**Ohio Engineering Co.**, 105 Sixth St., Lorain, O. LB **$501,797**, est. $518,900. (3 bidders) Type T-35 2.556 mi., SR 254-(2.40-3.38) S 951 (4), U-1094 (1), Lorain Co.;

O.—**Fenton Constr. Co.**, P. O. Box 310, Ashland, O. LB **$86,600**, est. $93,000. (3 bidders) Type T-35 1.939 mi. USR 40-0.00 (14.64-16.04), village of West Jefferson, Franklin and Madison Counties;

O.—**Ohio Valley Paving Corp.**, 34 and Belmont Sts., Bellaire, O. LB **$75,638**, est. $91,400. (2 bidders) Type T-35 4.439 mi. SR 265-(12.27) (14.90), Guernsey Co.;

O.—**Rome Daugherty**, Glenford, O. LB **$80,934**, est. $101,700. (9 bidders) Type T-32 on B-119 and structures 0.464 mi. SR 595-(3.77) (4.70), Hocking Co.;

C.—**Kulka Industrial Corp.**, 826 N. Webb Ave., Alliance, O. LB **$159,987**, est. $163,700. (5 bidders) Type T-170 and structure 0.383 mi. SR 664-15.99, Hocking Co.;

O.—**Tri-State Asphalt Corp.**, South Broadway, Martins Ferry, O. LB **$125,479**, est. $154,400. (1 bidder) Type T-35 on B-20 2.689 mi. SR 7-(29.61-31.47) villages of Empire and Stratton, Jefferson Co.;

O.—**Chapin & Chapin, Inc.**, Norwalk, O. LB **$518,345**, est. $544,400. (2 bidders) Type T-35 and structures 4.66 mi. SR 18-(2.44-6.70), Medlan Co.;

O.—**L. R. Skelton**, 38 Powhatan Ave., Columbus, O. LB **$1,115,468**, est. $1,178,000 (4 bidders) Type T-35 on B-119 and structure 7.742 mi., USR-22-0.00, 6.83, Muskingum and Perry Counties.;

O.—**V. N. Holderman & Sons, Inc.**, 890 Oakland Park Ave., Columbus, O. LB **$966,611**, est. $1,155,000. (9 bidders) type T-71 and structures 5.835 mi., USR 23-(1.43-3.74), Pickaway Co.;

O.—**Murray Constr. Co.**, P. O. Box 231, Waverly, O. LB **$121,390**, est. $140,500 (4 bidders) Type T-35 and structure 0.74 mi. USR 50-(11.42-11.78) Ross Co.;

O.—**Harper Supply, Inc.**, 118 W. Front St., Napoleon, O. LB **$784,447**, est. $779,800 (6 bidders) Type T-35 on B-20 and structure 4.109 mi., USR 224-10.66, Seneca Co.;

O.—**Ohio Road Paving Co., Inc.**, 30 E. Broad St., Columbus, O. LB **$80,165**, est. $81,800 (1 bidder) Type T-35, 2.786 mi. USR 30-(12.34-12.48), (13.45), USR 62 (18.81-19.01) (19.54-19.80); SR 8-(9.40-9.46) (10.69) city of Canton, Stark Co.;

O.—**Odell Constr. Co.**, Prouty Rd., Painesville, O. LB **$80,808**, est. $81,800 (1 bidder) Type T-35 on B-119, 0.219 mi. SR 91-14.40 village of Hudson, Summit Co.;

O.—**L. P. Cavett Co.**, 511 Shepherd Ave., Lockland, O. LB **$87,170**, est. $91,500 (2 bidders) Type T-35 5.698 mi. USR 42-4.59, Union Co., Bids Sept. 13;

O.—cancelled bids to have been opened Sept. 13 Type T-35 on B-119 and structures 0.378 mi. CR 84 S 396 (2), Allen Co.; Type T-35 and structures 6.878 mi., USR 6-(0.08-1.75) village of Vermilion, village of Vermilion-on-the-lake, Erie and Lorain Counties. CD 8/26.

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▲ **Williams Bros. Co.,** National Bank Tulsa Bldg., Tulsa, Okla. CA **$1,000,000.** Total est. $10,000,000. 1st section of 110 mi. coal transmission pipe line from Cadiz to Eastlake, OHIO. Pittsburgh Consolidation Coal Co., Koppers Bldg., Pittsburgh, Pa. Ford, Bacon & Davis, Inc., 39 Broadway, New York, N. Y., engr. CD 4/28/54.

▲ **INDIANA**—Indiana Toll Road Comn., 309 W. Washington St., Indianapolis, Zone 4,
Union Building & Constr. Corp., 631 Main Ave., Passaic, N. J., LB **$3,319,560.** Contract C-7, grading, drainage, structures, paving approx. 2.12 mi. Contr. Sect. C-7, Indiana-East West Toll Road, beginning at point approx. 3,343 ft. westwardly from center line of Cline Ave. in City of Hammond at Toll Road Station 675 plus 00 and extending eastwardly a distance of about 11,200 ft. to point at Toll Road Station 787 plus 00, said point beginning westwardly about 1,845 ft. from centerline of Durbin St. in City of Gary. Bids Sept. 14. CD 8/22.

WISCONSIN—State Hy. Comn., State Hy. Office Bldg., Madison,
C. R. Meyer & Sons Co., 50 State St., Oshkosh, Wis., CA **$936,461.** Oregon-Jackson St. Bridge and approaches, U.S. Hy. 45, Proj. T 5901 (1), Winnebago Co. Bids Sept. 8. CD 9/13, under LB.

▲ **Dearborn-Melvindale Disposal Auth.,** Dale H. Fillmore, chn., Dpt. Law, City Hall, Dearborn, Mich. cancelled bids to have been opened Sept. 20, refuse incinerator, DEARBORN, MICH. CD 8/9.

BUILDINGS—LB & CA

▲ **H. W. Marcuson Builders,** 5703 Curtis Ave., Cleveland, O. CA Est. **$1,100,000.** 2 story, 74 unit MOTEL, on 150x404 ft. site, 3333 Euclid Ave., CLEVELAND, O. Watson Realty Co., c/o Louis Skolnik, archt., Perry-Payne Bldg., Cleveland 14, O. Awarded Sept. 15.

E. Elford & Son, 555 S. Front St., Columbus, O. CA general contract 1 story, steel, concrete, 53,000 sq. ft. PLANT, COLUMBUS, O. Total est. **$500,000.** Borden's Moores & Ross Div., 165 N. Washington Ave., Columbus;
Electrical Contractors, Inc., 1343 Holly Ave., Columbus, O. CA, electrical work (Columbus, O.);
Limbach Co., 1183 Essex Ave., Columbus, O. CA plumbing and heating work (Columbus, O.);
Armstrong Cork Co., 1282 Edgehill Rd., Columbus, O. CA insulation work (Columbus, O.);
York Corp., 2910 Herbert Rd., Columbus, O. CA refrigeration work (Columbus, O.).

▲ **Dwight-Lloyd Div. of McDowell Co., Inc.,** 3203 W. 71 St., Cleveland, O. CA **$20,000,000.** cement PLANT, between Elyria Ave. and Black River running from Eleventh to Sixteenth St., LORAIN, O. Universal Atlas Cement Co., 101 Park Ave., New York, N. Y. CD 7/13.

▲ **Westinghouse Electric Corp.,** P.O. Box 868, Pittsburgh 30, Pa. CA 156,250 kw. TURBO-GENERATOR for Walter C. Beckjord Station, NEW RICHMOND, O. Total est. **$25,000,000.** Cincinnati Gas & Electric Co., P.O. Box 960, Cincinnati 1, O.;
Combustion Engineering, Inc., 200 Madison Ave., New York, N. Y. CA 1,000,000 lb./hr. boiler (New Richmond, O.);
Dravo Corp., Neville Island, Pittsburgh, Pa. CA piers and piling for power house (New Richmond, O.). Substructure and superstructure contracts not awarded. **(Correction**—contractors and size of unit). CD 8/10, under CA.

▲ **Knowlton Constr. Co.,** Bellefontaine, O. CA **$2,034,870.** general contract HIGH SCHOOL, SANDUSKY, O. Bd. Educ., High School Bldg., Sandusky, O. Bids Sept. 20. CD 8/23.

▲ **Cuyahoga County Hospital,** Court House, Cleveland 13, O. rejected bids Aug. 29, county hospital alterations and addns., with chapel, WARRENSVILLE, O. LB $1,303,000 general contract. Will re-advertise. CD 9/1, under LB.

Ridgewood Homes, Inc., 6556 W. 14 St., Indianapolis, Ind., Owner Builds. **$400,000.** HOMES, west side of INDIANAPOLIS, IND.

▲ **Hagerman Constr. Co.,** 403 Strauss Bldg., Fort Wayne, Ind. CA Est. **$1,000,000.** 132,000 sq. ft. FACTORY, LIGONIER, IND. Iron Fireman Mfg. Co., 3170 W. 106 St., Cleveland, O. **(Correction**—contractor). CD 8/31, under CA.

Arthur Vander May Realty Co., 10719 S. Western St., Chicago, Ill. Own Forces. **$607,000.** 40 HOMES, THORNTON, ILL.

Theo. Molzahn & Sons, Inc., 1812 Madison St., La Crosse, Wis., CA Est. **$500,000.** 1 story, 122x440 ft. concrete, steel, brick, block PLANT addn., LA CROSSE, WIS. Trane Co., 206 Cameron Ave., La Crosse, Wis. CD 8/24.

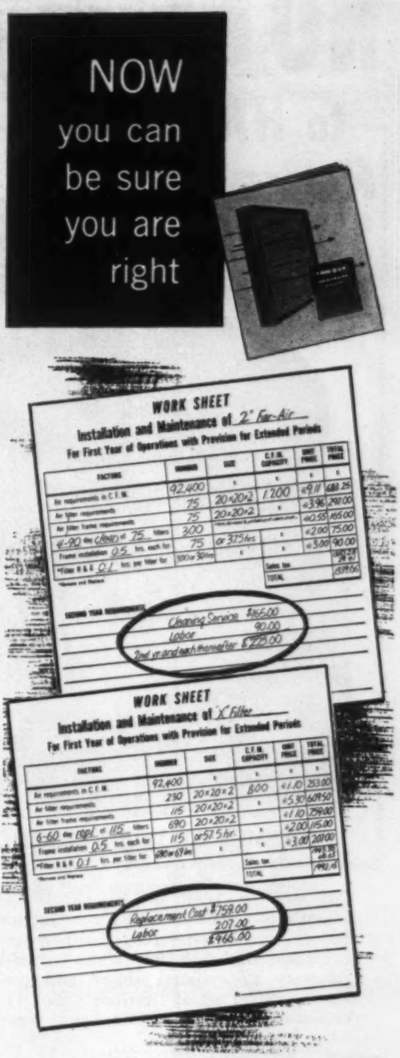
▲ **Selzer-Ornst Co.,** 6222 W. State St., Wauwatosa 13, Wis., CA Est. **$1,000,000** general contract 4 story, 110x240 ft. OFFICE, MILWAUKEE, WIS. Associated Hospital Services, 826 N. Plankington St., Milwaukee, Wis. Bids Sept. 7. CD 8/17.

▲ **Frankel Brothers,** Huntington Woods, Mich. Owner Builds. **$2,000,000.** Franklin Woods SUBDIVISION, 90 acre site Franklin between 14 and 15 Mile Rds., BERKLEY, MICH.

▲ **Edward Rose & Sons,** 14900 Linwood St., Detroit, Mich. Owner Builds. **$2,200,000.** Lahser Meadows Subdivision, 189 brick HOMES, Lahser and Eight Mile Rds., DETROIT, MICH.

▲ **Mount Clemens Constr. Co.,** 27225 Hickler Lane, Mount Clemens, Mich. CA Est. **$1,220,000.** Hall Heights Development, 100 brick HOMES, Gratiot and Hall Rds., MOUNT CLEMENS, MICH. Rose-Hill Co., 14601 E. Seven Mile Rd., Detroit, Mich.

▲ **Wiseman & Turo Constr. Co.,** 28201 Bell St., Southfield, Mich. Owner Builds. **$2,500,000.** River Crest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Installation and Maintenance of 2" Far-Air
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Labor 90.00
2nd yr and each thereafter $255.00
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$966.00

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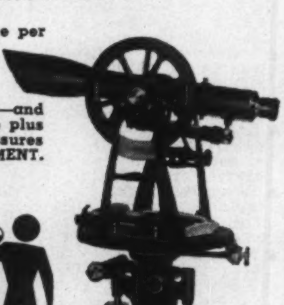


Development, 43 brick ranch HOUSES, Bittersweet Lane between 11 and 12 Mile Rds., SOUTHFIELD, MICH.

WEST OF MISSISSIPPI

BUILDINGS—BA

Tex., Galena Park—SCHOOLS—BA 10/10—Galena Park Independent School Dist., Galena Park, Cloverlief Junior High School and Elementary School in Fidelity Manor subdivision. $800,000. Plans deposit $150. H. Voelcher & Assocs. 1202 Dennis St., Houston, archts. CD 4/29/54.

▲ **Minn., St. Paul**—PLANT—BA 10/11—Engineering Research Associates of St. Paul, Div. of Remington Rand, 543 St. Peter St., 1 story, 200,000 sq. ft. electronics plant between W. 7 St. and Davern St., Norfolk Ave. and Mississippi River, $2,000,000. Ellerbe & Co., E. 505 First National Bank Bldg., engrs. CD 6/15.

▲ **Tex., El Paso**—Y. M. C. A. BUILDING—BA 10/11—Young Men's Christian Assn., 530 N. Oregon St., Central Y. M. C. A. bldg. $1,500,000. Plans deposit $75. Monroe, Licht & Higgins, 827 Yandell Blvd., archts. and engrs. Blum & Guerrero, 4930 Maple St., Dallas, engrs. CD 9/19.

Mo., Ferguson-Florissant—SCHOOL, etc.—BA 10/15—Ferguson-Florissant school Dist. R-2, Bd. Educ., Virgil C. McClure, supt. Schools, 200 Church St., Ferguson, 1 and 2 story Junior High School, 60x155 ft. bus garage, Hy. 66 between Old and New Florissant Rds., Florissant; 2 story, bsmnt. administration bldg., January and Day Aves., Ferguson. $610,000. Charles W. Lorenz, 700 N. Ballas Rd., Rte. 13, Box 1378, Kirkwood, Zone 22, archt.

▲ **Neb., Lincoln**—HIGH SCHOOL—BA 10/19—Chancery Office, 514 S. 18 St., St. Pius X High School. $1,000,000. Fritz Craig & Jack Beers, 724 1st Natl. Bank Bldg., archts. CD 4/21.

Tex., Andrews—SCHOOL—BA 10/25—Andrews Independent School Dist., Andrews, elementary school and appurtenant rooms. $511,000. Plans deposit $25. Caudill, Rowlett, Scott & Assocs., Bryan, archts. A. M. Martin & J. W. Hall, Jr., Bryan, engrs. CD 8/18.

▲ **Tex., Houston**—HIGH SCHOOL—BA 11/3—Houston Independent School Dist., 1300 Capitol St., Kashmere Gardens Junior High School. $1,250,000. Plans deposit $50. Wirtz, Calhoun, Tungate & Jackson, 2506 Richton Dr. archts. CD 9/14/54.

BUILDINGS—SLC

▲ **Iowa, Iowa City**—PLANT—Procter & Gamble Mfg. Co., Gwynne Bldg., Cincinnati, O., soon lets contract drug products plant. Over $1,000,000. A. N. Kinney, Inc., 2905 Vernon Pl., Cincinnati, O., archt. CD 4/13.

Tex., Austin—CLASSROOMS, etc.—Episcopal Theological Seminary of Southwest, 32nd and Duval Sts., soon lets contract, approx. 37,000 sq. ft. masonry classrooms-library-administration bldg. units. $400,000. Fehr & Granger, 502 E. 5th St., Dallas, archts. Wilson & Cottingham, Brown Bldg., and Blum & Guerrero, 4930 Maple St., Dallas, engrs. CD 9/14.

HEAVY CONSTRUCTION—LB & CA

▲ **Western-Knapp Eng. Co.,** Hibbing, Minn. CA, **$850,265.** general contract water treatment plant, ST. CLOUD, MINN. City, A. J. Haberkorn, clk.-treas., St. Cloud, Minn., CD 8/30, under LB;
G. A. Bass Constr. Co., Birmingham, Mich. CA **$615,201.** major equip. and process piping. (St. Cloud, Minn.). CD 9/1, under LB.

Stimson Corp., Box 5302, Dallas, Tex., LB **$405,604,** est. $1,000,000. c.i. water lines, incl. pipe, 54,000 lin. ft. 20 in.; 22,000 lin. ft. 24 in., incl. appurtenances, from Wylie to McKinney, DALLAS, TEX. North Texas Municipal Water Dist., H. B. Bisby, Wylie, Tex. Forrest & Cotton, 83 Praetorian Bldg., Dallas, Tex., engrs. Bids Sept. 13. CD 10/23/53.

▲ **Steenberg Constr. Co.,** 1371 Marshall Ave., St. Paul, Minn. LB **$1,448,000.** (6 bidders). exten. water treatment plant, ST. PAUL, MINN. City, L. E. Kinvig, city purch. agt., 253 City Hall, St. Paul, Minn. Bids Sept. 20. CD 9/15.

† **Patton-Tully Transportation Co.,** 1242 N. 2nd St., Memphis, Tenn., LB **$586,906,** constr., repair standard dikes and revetment, Missouri River, Middle Omaha Mission-Monona Bends, near Whiting, Inv. 25-066-56-23, IOWA. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Sept. 14. CD 9/8.

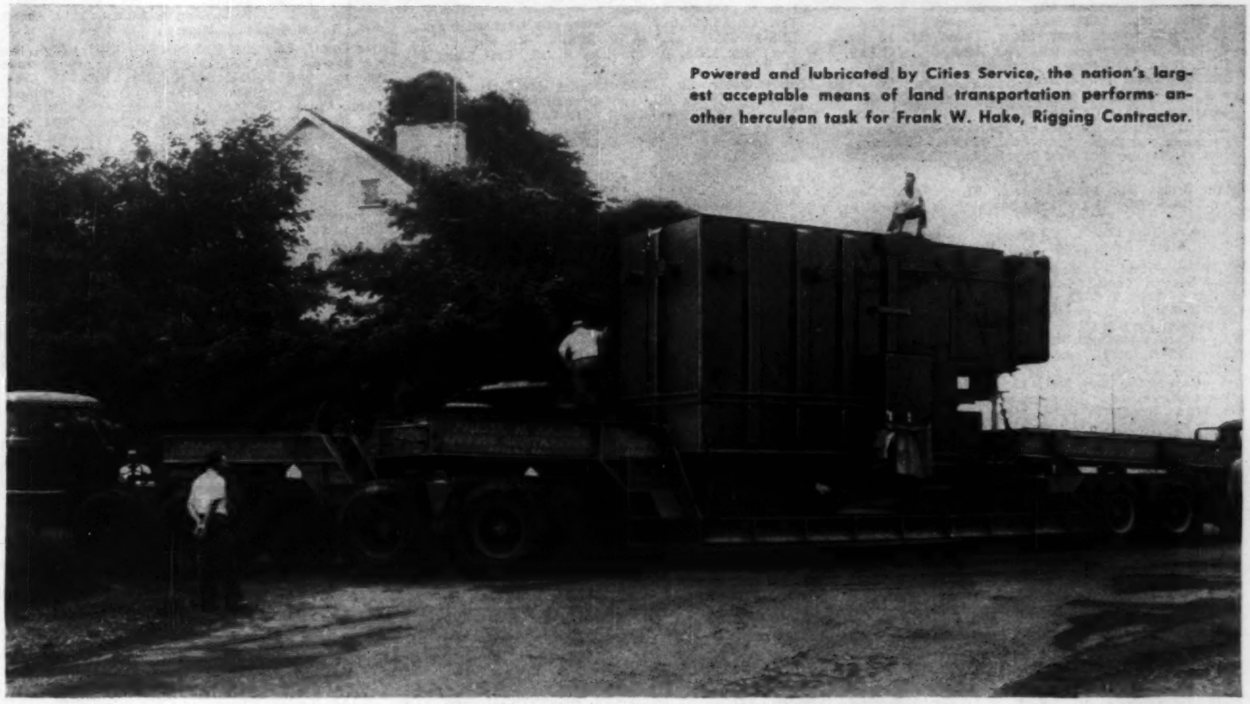
† **E. A. Kramme Co., Inc.,** 5770 2 Ave., Des Moines, Iowa, CA, **$990,859.** bridges, pavement, railroad track at Coralville Reservoir Proj. Inv. 11-117-56-4, IOWA. U. S. Eng., Clock Tower Bldg., Rock Island, Ill. Bids Aug. 30. CD 9/8, under LB.

† **Patton-Tully Transportation Co.,** 1242 N. 2 St., Memphis, Tenn., CA, **$586,906.** repairs, constr. standard dikes and revetment Missouri River Lower Monona-Omaha Mission Bends, Inv. 25-066-56-23, near Whiting, IOWA. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Sept. 14. CD 9/21, under LB.

† **Farnsworth & Chambers, Inc.,** P.O. Box 74, Houston, Tex., LB, **$737,407,** est. $772,380, ordnance storage, igloos and buildings, Little Rock Air Force Base, ENG-03-050-56-4, JACKSONVILLE, ARK. U. S. Eng., P.O. Box 867, Little Rock, Ark. Bids Sept. 14.

† **SOUTH DAKOTA**—Bureau P. Rds., Dpt. Commerce, Bldg. 40, Denver Federal Center, Denver, Colo.
Peter Kiewit Sons Co., 245 Fort Rd., Box 875, Sheridan, Wyo., LB **$480,884,** est. $75,000, base, bit. surf. 12.331 mi. Cedar Pass-Pinnacles, Proj. 1-A, B (Port) Jackson and Pennington Counties. Bids Sept. 15. CD 9/9.

(Continued on page 364)



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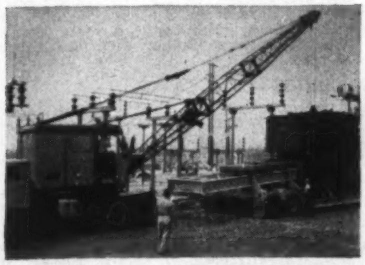


More Craning, Less Straining is another benefit enjoyed by the Frank W. Hake firm, using Cities Service products. Trucks, tractors, trailers, hoisting engines—all 36 pieces of mechanized equipment get Cities Service care.

Carrying a 91-ton transformer over secondary roads is just routine work for this mammoth rigging unit of the Frank W. Hake rigging firm, Philadelphia, Pa.

The nation's largest acceptable means of land transportation, the unit measures over 106 feet long, 12 feet wide, 17½ feet high and weighs 150 tons just by itself!

All told, that's 241 tons on the move, thanks to the power and lubrication of Cities Service petroleum products!

Why Cities Service? Partner Glenn F. Hake puts it this way: "When you work with the biggest piece of equipment, you've got to choose the petroleum products that do the biggest job . . . and that's Cities Service. For the past eight years, we've used Cities Service gasolene, diesel fuel, lubricants, and solvents—in *all* our transportation and construction equipment . . . trucks, tractors, trailers, truck cranes, hoisting engines, air compressors, and other equipment too numerous to mention. In fact, we even use Cities Service Fuel Oils to heat our business properties and our homes.

"We can truthfully state, without reservation, that we have had excellent service and performance at all times, and would heartily recommend Cities Service products to others."

If you're interested in Mr. Hake's suggestion, talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

(Continued from page 362)

▲† **Tecon Corp.**, 1201 Main St., Dallas, Tex. LB **$3,673,155.** outlet work, Stage II and No. 13 Hy. By-Pass, Tuttle Creek Dam and Reservoir, KANSAS. U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo. Bids Sept. 20. CD 8/25.

▲† R. B. **Potashnick Constr. Co.**, Box 423, Cape Girardeau, Mo., CA **$5,758,287**, est. $5,000,000. constr., complete Ferrells Bridge Dam and appurtenances Cypress Creek, Marion Co., TEXAS. U. S. Eng., foot of Prytania St., New Orleans, La. Bids Aug. 19. CD 8/23, under LB.

Austin Bridge Co., 1000 Singleton Blvd., Dallas, Tex. LB **$409,635**, est. $380,000. grade separation Mulberry St., SHERMAN, TEX. City, c/o mayor, Sherman, Tex. Freese & Nichols, 407 Danciger Bldg., Fort Worth, Tex., engrs. Bids Sept. 16.

WYOMING—State Hy. Comn., Cheyenne,

Wyo.—**Summit Constr. Co.**, 728 St. Anne St., Rapid City, S. D., LB **$422,401.** base, sand-gravel seal 1 M.P.C.MP, 2 rein.-con. culverts, 7.136 mi. Manville-Lusk Rd., Proj. F-170 (6) Unit 1, Niobrara Co.;

Wyo.—rejected bids Sept. 15, sand-gravel seal one rein.-con. culvert, 3.142 mi. Glendo-Wheatland Rd. F-165 (5), Platte Co.;

Wyo.—received no bids Sept. 15, grading, draining, pit run base, cattleguards and misc. work 4.527 mi. Kendall Rd., Sublette Co. CD 9/7.

▲† **C. H. Leavell Co.**, 1900 Wyoming St., El Paso, Tex. LB **$3,068,547.** laboratory and technical bldgs., ENG-29-005-56-17, ALAMOGORDO, N. M. U. S. Eng., Box 1538, Albuquerque, N. M. Bids Sept. 6. CD 8/10.

Madsen Constr. Co., 2110 Nicollet Ave., Minneapolis, Minn. CA **$905,700.** general contract JUNIOR HIGH SCHOOL, ROSEVILLE (P.O. ST. PAUL), MINN. Bd. Educ., Independent School Dist. No. 3, Ramsey Co., T. C. Schultz, clk., Roseville, Minn. CD 9/8, under LB.

J. Leck Co., 211 S. 11 St., Minneapolis, Minn. CA **$600,000.** general contract 1 story, 90x306 ft., OFFICE, Como Ave. and Eustis St., ST. PAUL, MINN. Group Health Mutual, Inc., G. W. Jacobson, secy., 180 N. Snelling Ave., St. Paul, Minn. CD 6/8.

▲ **Haren & Laughlin Constr. Co.**, 953 Minnesota St., Kansas City, Kan. CA general contract 1 story, 323x459 ft. WAREHOUSE, U. S. Hy. 71 and Bellefontaine St., KANSAS CITY, MO. Total est. **$1,500,000.** Avon Products Co., 1535 Walnut St., Kansas City, Mo. Bids Sept. 2, CD 8/25;
U. S. Eng. Co., 914 Campbell St., Kansas City, Mo. CA plumbing and heating work (Kansas City, Mo.); **Air Contractors, Inc.**, 1922 Grand St., Kansas City, Mo. CA air-conditioning work. (Kansas City, Mo.).

L. E. Oslie & Co., Inc., 804 N. 12 St., Fargo, N. D., CA Est. **$750,000.** North Port SHOPPING CENTER, FARGO, N. D. J. P. Melberg & Assocs., 3717 Abbott Ave. N., Minneapolis, Minn.

Estrin Constr. Co., 828 E. Ninth St., Kansas City, Mo. CA Approx. **$750,000.** structural part only 177,000 sq. ft. WAREHOUSE and OFFICE, KANSAS CITY, KAN. Jack Merriman & W. W. Zimmer, Commerce Bldg., Kansas City, Kan. Wm. F. Fullerton, 15 W. 10 St., Kansas City, Mo., and Earl McCamis, 1804 Swift St., Kansas City, Mo., archts. B. F. Goodrich Co., 621 E. 14 Ave., Kansas City, Mo., lessee.

Anderson Constr. Co., 445 14 St., Beaumont, Tex. Owner Builds. **$400,000.** 20 DWELLINGS, BEAUMONT, TEX. CD 5/24.

▲† **Stearns-Roger Mfg. Co.**, 660 Bannock St., Denver, Colo., CA Est. **$4,000,000.** design and construct, HELIUM PLANT, EXELL, TEX. Bureau Mines, Dpt. Interior, Box 911, Amarillo, Tex. CD 9/2.

Texas Gulf Building Corp., 7525 S. Park St., Houston, Tex. Owner Builds. **$395,500**, 45 DWELLINGS; **$351,000.** 38 DWELLINGS, HOUSTON, TEX. CD 6/20.

Eitze-Kitchens Constr. Co., Box 3116, Austin, Tex., CA **$644,000**, est. $800,000. group of WARD BLDGS., MEXIA, TEX. Bd. for Texas State Hospitals & Special Schools, 45 and Lamar Sts., Austin, Tex. Bids Sept. 8. CD 9/15 under LB.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
October 13, 25 California
STREETS AND ROADS
October 12, 19, 20 California

Calif., San Luis Obispo—BA 10/19—State Div. Architecture, P. Wks. Bldg., Sacramento, site development and clearance and relocation for engineering bldg., State Polytechnic College. $400,000. Plans deposit $50. Extended date. CD 8/30.

BUILDINGS—BA

Calif., Whittier—SCHOOLS—BA 10/19—Whittier Union High School Dist., 610 W. Philadelphia St., reinforced brick El Rancho High School addns. $360,000. Plans deposit $50, CD 10/4/54; reinforced brick California High School addns., $402,000, Plans deposit $50. Wm. H. Harrison, 816 W. 5 St., Los Angeles, archt.

Calif., Whittier—SCHOOL—BA 10/26—Whittier Union High School Dist., 610 Philadelphia St., reinforced brick Santa Fe. High School buildings, Santa Fe Springs, $783,000. Plans deposit $50. Wm. H. Harrison, 816 W. 5 St., Los Angeles, archt.

BUILDINGS—SLC

▲ **Calif., Palo Alto**—DORMITORIES—Bd. Regents of Stanford University, Palo Alto, soon lets contract 7 girl's dormitories. $1,000,000. Milton T. Pfleuger, 580 Market St., San Francisco, archt. CD 5/3.

BUILDINGS—LB & CA

▲† **Guy F. Atkinson Co.**, 10 W. Orange Ave. S., South San Francisco, Calif. and **Ostrander Constr. Co.**, Terminal Sales Bldg., Portland, Ore., LB **$4,338,085**, or with credit for salvage of materials, **$4,319,085** (6 bidders), closure dam and removal of cofferdam, The Dalles Dam, Wasco Co., CIVENG-35-026-56-1, OREGON. U. S. Eng., Pittock Block, Portland, Ore. Bids Sept. 20. CD 9/15.

▲† **Guy F. Atkinson**, Box 259, Long Beach, Calif., LB **$1,232,077**, Los Angeles River Imprv., River Mile 4.97 to 4.63, Long Beach, Los Angeles Co., CIVENG-40-353-56-8, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Sept. 20. CD 8/22.

▲† **Price-McNemmar Co.**, Box 544, Sepulveda, Calif., LB **$1,042,082**, tactical and administrative facilities, Special AAA sites, ENG-04-353-56-1, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Sept. 20. CD 9/1.

▲† **Guy F. Atkinson**, Box 259, Long Beach, Calif., LB **$1,232,077**, Los Angeles River Imprv., River Mile 4.97 to 4.63, Long Beach, Los Angeles Co., CIVENG-40-353-56-8, CALIFORNIA. U. S. Eng., 751 Figueroa St., Los Angeles, Calif. Bids Sept. 20. CD 8/22.

▲ **Eaton & Smith, Constr. Co.**, 1215 Michigan St., San Francisco 7, Calif., LB, **$4,178,888** (4 bidders) earthwork, embankment, on Nacimento River and dam vicinity, 9 mi. southwest of Bradley, SALINAS, CALIF. Monterey County Flood Control & Water Conservation Dist., Court House, Salinas, Calif. Bids Sept. 19. CD 8/22.

BUILDINGS—LB & CA

Garf, Ryberg & Garf, 850 W. 15th N., Salt Lake City, Utah, LB **$757,000**, general constr. 8 story Beneficial Life BUSINESS BLDG., SALT LAKE CITY, UTAH. Zion Security Corp., Union Pacific Annex Bldg., Salt Lake City, Utah. Bids Sept. 2. CD 8/26.

Guthrie Constr. Co., 10703 Renton Ave., Seattle, Wash. Own Forces, **$906,000**, 60 HOMES (first unit) of Evergreen Hills Addition, SEATTLE, WASH. CD 9/22.

▲† **George A. Fuller Co.**, 3100 W. 8 St., Los Angeles, Calif., LB, **$1,230,400** (7 bidders) buildings, structures, Phase 2, Coca Area, Santa Suzana, for Atomic Energy Comn., Wash., D. C., CALIFORNIA. North American Aviation, Inc., 12241 Lakewood Blvd., Downey, Calif. Bids Sept. 19. CD 9/16.

▲ **E. I. du Pont de Nemours & Co.**, du Pont Bldg., Wilmington, Del., Own Forces, **$5,000,000.** design and construct PLANT addns. for Electrochemicals Dpt.

(Continued on page 368)

B-160
Master

LOW COST PORTABLE HEAT
saves time and money for contractors

For only a few cents an hour in fuel, you can dry plaster, fast, even on cold or humid days; pour and cure concrete safely at any temperature and keep men working, inside or out, in freezing weather. That saves hours of time . . . and time means money.

Your Master Heater rolls into place, starts at the flip of a switch. You don't need a vent. Three models put out 100,000; 160,000 or 400,000 BTU's per hour; burn inexpensive kerosene or fuel oil.

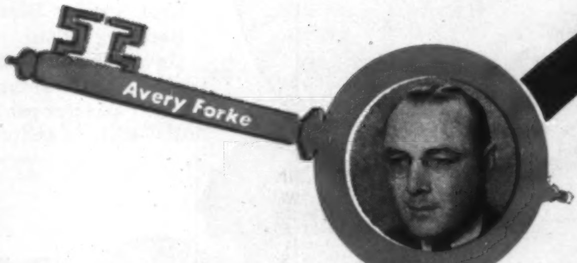
The low price is repaid time after time in hours saved and workmen working.

Write for full information or see your Master distributor.

MASTER VIBRATOR COMPANY
342 Stanley Ave., Dayton 1, Ohio

MASTER

the "4-KEYS" for successful equipment selling ...at auction



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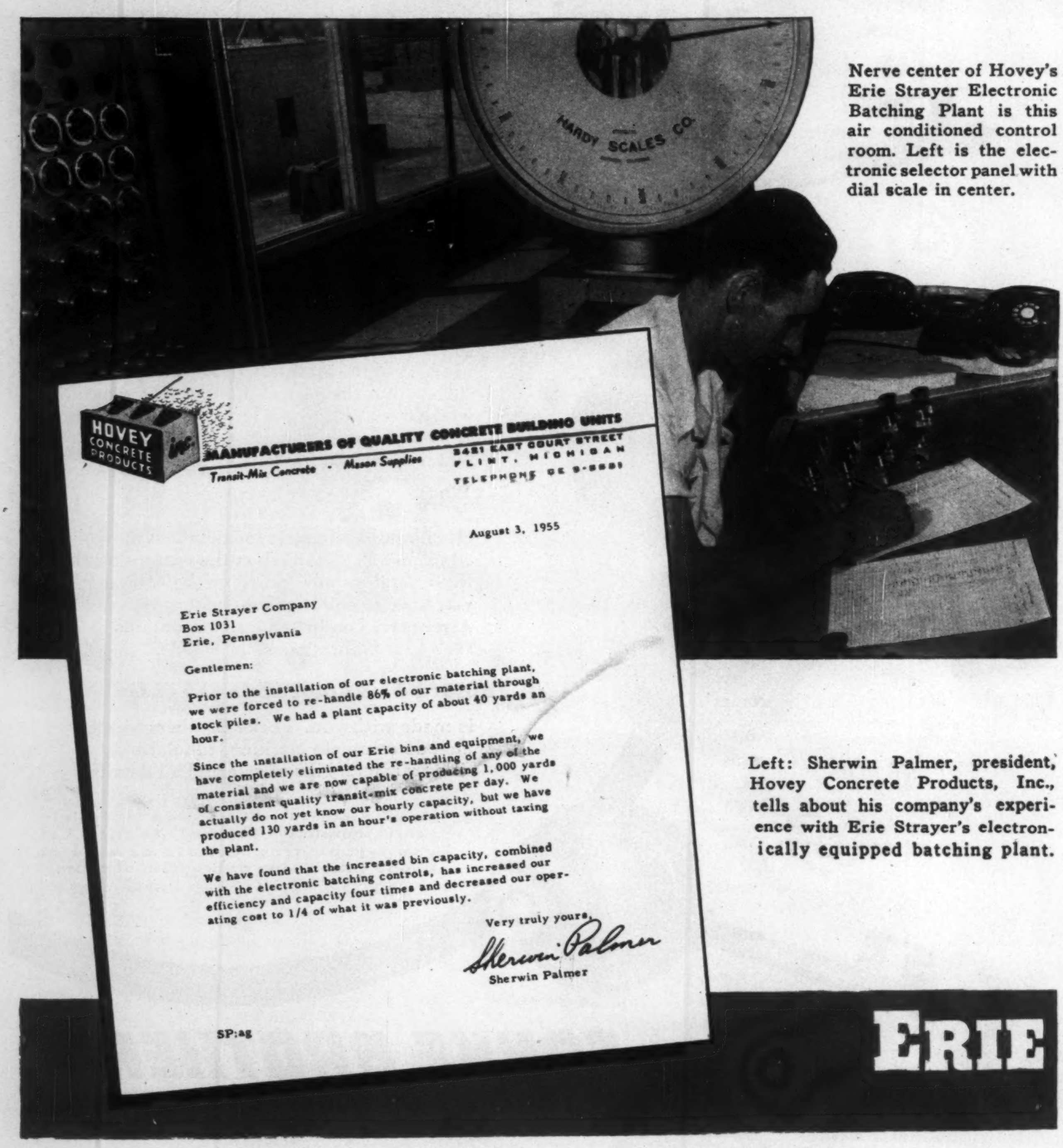
ERIE STRAYER
ELECTRONIC
TRIPLES PRODUCTION AT


HARDY SCALES CO.

Nerve center of Hovey's Erie Strayer Electronic Batching Plant is this air conditioned control room. Left is the electronic selector panel with dial scale in center.

HOVEY CONCRETE PRODUCTS inc.
MANUFACTURERS OF QUALITY CONCRETE BUILDING UNITS
Transit-Mix Concrete · Mason Supplies
2421 EAST COURT STREET
FLINT, MICHIGAN
TELEPHONE CE 9-8881

August 3, 1955

Erie Strayer Company
Box 1031
Erie, Pennsylvania

Gentlemen:

Prior to the installation of our electronic batching plant, we were forced to re-handle 86% of our material through stock piles. We had a plant capacity of about 40 yards an hour.

Since the installation of our Erie bins and equipment, we have completely eliminated the re-handling of any of the material and we are now capable of producing 1,000 yards of consistent quality transit-mix concrete per day. We actually do not yet know our hourly capacity, but we have produced 130 yards in an hour's operation without taxing the plant.

We have found that the increased bin capacity, combined with the electronic batching controls, has increased our efficiency and capacity four times and decreased our operating cost to 1/4 of what it was previously.

Very truly yours,
Sherwin Palmer
Sherwin Palmer

SP:ag

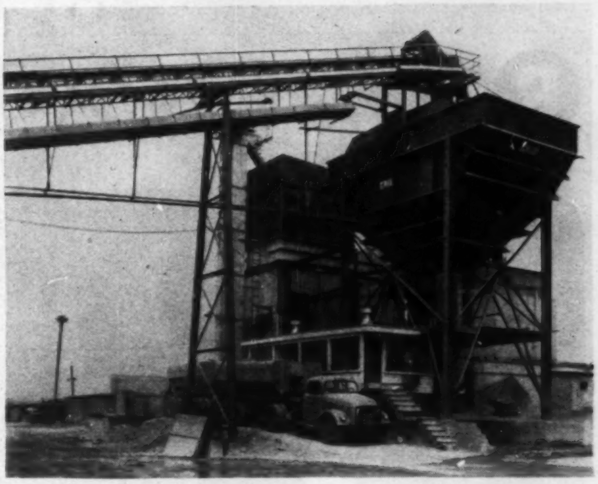
Left: Sherwin Palmer, president, Hovey Concrete Products, Inc., tells about his company's experience with Erie Strayer's electronically equipped batching plant.

ERIE

BATCHING PLANT
HOVEY CONCRETE PRODUCTS

FLINT MICH. FIRM NOW ENJOYS THESE COST-CUTTING ADVANTAGES

1. **Output Up from 40 YPH to 130 YPH**
2. **Materials Handling Cost Cut 75%**
3. **It's Still a One-Man Operation**



General view of Hovey Concrete Products, Inc., Flint, Michigan. Plant was sold by Contractors Machinery Co., Detroit.

Hovey, Inc. are volume producers of transit-mix concrete and concrete building units. Their customers demand fast service on specification concrete.

Early this year, Sherwin Palmer, president, bought an Erie Strayer Plant equipped with electronic controls for pre-set batching. At the touch of a button the operator can have any one of 5 different batches. All specifications are well within turnpike tolerances.

Mr. Palmer's letter, left, tells how this new plant has greatly increased production and cut costs.

You, too, can enjoy these important benefits. An Erie Strayer plant with electronic controls gives you complete control over your entire batching day. When your operator reports, he simply sets the controls for the batches he will need that day. From then on he merely pushes buttons. Electronics does the rest.

Electronic selectors can be installed to provide as many different pre-set batches as you need. Five—as in the Hovey plant—or any number to suit your requirement. And always, a flick of the switch puts you on pushbutton operation whenever a single special batch is needed.

What about operating costs? It takes just one man to operate any Erie Strayer Plant—electronic or mechanical. Less current than that used by a 100-watt bulb operates the electronic control system. Maintenance is normally negligible.

And the electronically controlled plant has the same money-saving features that have made Erie mechanical plants famous: Quick, economical erection; Free flow of materials from bins to batchers; Faster batching and discharging cycle; Built to last but with all standard parts for easy replacement.

An Erie Strayer Plant with electronic controls soon pays for itself. Add up all its features, then ask yourself if you can afford not to "Go Erie—Go Electronic"!

For Literature Write Dept. E95, Cable Address: EXIMPORT

ERIE STRAYER

BINS THE WORLD OVER

STRAYER COMPANY

295 GEIST RD. ERIE, PENNSYLVANIA

(Continued from page 360)

to mfg. sodium ethyl chloride, trichlorethylene and perchlorethylene, ANTIOCH, CALIF.

Ashby & Opperman, Box 127, Bakersfield, Calif., CA **$558,855**, est. $455,000, AUDITORIUM and MUSIC BLDG., Shafter High School, Shafter, BAKERSFIELD, CALIF. Kern County Union High School Dist., 312 Bernard St., Bakersfield, Calif. Bids Sept. 12. CD 8/26.

Mortex Constr. Co., 7700 Sunset Blvd., Los Angeles, Calif., Owner Builds, **$884,700.** 80 frame, stucco DWELLINGS, Lyndora, Fairfield, Crossdale and Berson Sts., BELLFLOWER, CALIF. Hudson & Brockow, 2824 W. Olympic Blvd., Los Angeles, archts.

▲ **Concord Park Corp. & Collins Constr. Co.**, 1314 Crow Canyon Rd., Hayward, Calif. Owner Builds, **$2,862,000.** 159 HOME subdivision, CONCORD, CALIF.

Crown Constr. Co., 1231 S. La Brea St., Los Angeles, Calif., Owner Builds, **$440,000.** 39 DWELLINGS, 17 St. West, Lorimer Ave. and Avenue "J", LANCASTER, CALIF.

▲ **Robert E. McKee**, 4701 San Fernando Rd., Los Angeles, Calif., LB, **$7,147,000.** (5 bidders) OSTEOPATHIC UNIT at General Hospital, LOS ANGELES, CALIF. Los Angeles Co., Hall of Records, Los Angeles, Calif. Bids Sept. 21, CD 6/30;

Otis Elevator Co., 300 E. 8 St., Los Angeles, Calif., LB, **$442,500** elevator work (Los Angeles, Calif.).

United Constr. Co., 3839 Riverside Blvd., Sacramento, Calif., LB, **$666,839.** Cook Elementary SCHOOL and Babcock Elementary SCHOOL, NORTH SACRAMENTO, CALIF. North Sacramento Elementary School Dist., 110 Dixie Anne Ave., North Sacramento, Calif. Bids Sept. 15. CD 8/30.

▲ **Ford J. Twaits**, 449 S. Beaudry St., Los Angeles, Calif., CA, **$1,306,000.** 2 story, 162x205 ft. masonry, steel OFFICE, ORANGE, CALIF. Pacific Telephone & Telegraph Co., 740 S. Olive St., Los Angeles, Calif. Allison & Rible, 3670 Wilshire Blvd., Los Angeles, Calif., archts.

Hunny Investment Co., 2906 N. Garvey Ave., Pomona, Calif. Owner Builds, **$400,000.** 40 frame, stucco DWELLINGS, Lubin, Browning and Harrison Sts., POMONA, CALIF.

▲ **Hadley-Cherry**, 335 N. La Cienega Blvd., Los Angeles, Calif., Owner Builds, **$1,348,000.** 135 frame, stucco DWELLINGS, Hyde, Lovejoy and Vassar St., POMONA, CALIF. Roland L. Russel, 621 S. Hope St., Los Angeles, Calif., engr.

Bollenbacker & Kelton, Route 1, Box 476, San Diego, Calif. Owner Builds, **$894,400.** 80 frame, stucco DWELLINGS, Allied Gardens Tract No. 5, SAN DIEGO, CALIF.

▲ **James I. Barnes Constr. Co.**, 940 Spring St., Redwood City, Calif., CA **$2,917,900.** Unit 1, University of California MEDICAL CENTER, SAN FRANCISCO, CALIF. University of California, Medical Center c/o Eng., 1379 3 Ave., San Francisco, Calif. CD 8/26, under LB.

▲ **City and County of San Francisco**, Dpt. P. Utilities, City Hall, San Francisco, Calif., received no bids Sept. 15, 200-room HOTEL, San Francisco, International Airport, SAN FRANCISCO, CALIF. **$2,000,000.** CD 8/22.

General Motors Corp., (Chevrolet Div.), 8000 Van Nuys Blvd., Van Nuys, Calif. Owner Builds. **$600,000.** 125x750 ft. FACTORY OFFICE addn., VAN NUYS, CALIF.

CANADA

HEAVY CONSTRUCTION—BA

Ont., Camp Borden—BARRACK BLOCK, etc.—BA 10/18—Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, 250-man barrack block and outside services, Canadian Army Base. $500,000. Plans deposit $100.

BUILDINGS—BA

▲ **Ont., Petawana**—STORES, etc.—BA 10/12—Defence Constr. Ltd., 56 Lyon St., Ottawa, Q. M. and technical stores, guard house, lecture training, junior ranks club, etc., Army Camp. $1,000,000. Plans deposit $100.

N. S., Halifax—QUARTERMASTER and TECHNICAL STORES, etc.—BA 10/18—Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. quartermaster and technical stores bldg., outside services, Canadian Army Base. $500,000. Plans deposit $100.

▲ **Sask., Regina**—PLANT—Bids Asked—Hoesch Werke of Dortmund, West Germany, excavation and foundation work for steel pipe plant, near here. $3,000,000. CD 8/31.

HEAVY CONSTRUCTION—LB & CA

Fraser River Pile Driving Co. Ltd., foot of 20th St., New Westminster, B. C., CA **$789,409**, WHARF, ESQUIMALT, B. C. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. J. P. Carriere, c/o owner, engr.

Dawson, Wade & Co., Ltd., 775 Clark St., Vancouver, B. C., CA **$523,140**, rebuilding exten., and parking area at Smithers Airport, SMITHERS, B. C. Dpt. Transport, Hunter Bldg., Ottawa, Ont. CD 6/16, under LB.

▲ **Dominion Bridge Co. Ltd.**, Lachine, Que., LB, **$1,004,500**, supplying, erecting steel for new air terminal bldg., Dorval Airport, DORVAL, QUE. Dpt. Transport, Hunter Bldg., Ottawa, Ont. Bids Sept. 7. CD 8/24.

Canit Constr. Ltd., 507 Place d'Armes St., Montreal, Que., LB, **$555,250**, 48 in. trunk mains, from Champlain to Viau St., MONTREAL, QUE. City, City Hall, Montreal, Que. CD 9/13/44.

BUILDINGS—LB & CA

Rayner Constr. Ltd., 29 Commercial Rd., Leaside, Toronto, Ont., CA, Est. **$750,000.** moving 600,000 cu. yd. earth, sewers, water mains, causeway and road, at cement PLANT, CLARKSON, ONT. St. Lawrence Cement Co., 80 King St., W., Toronto, Ont. Awarded Sept. 16. CD 8/10.

Smith Brothers Constr. Co. Ltd., 1740 Ellen St., Niagara Falls, Ont., CA Est. **$533,000.** HIGH SCHOOL with double grymnasium, NIAGARA-ON-THE-LAKE, ONT. Niagara Town and Township District High School Bd., Niagara-on-the-Lake, Ont. Onasick & McMurtry, 79 Huntley St., Toronto, Ont., engrs. Bids Sept. 14, awarded Sept. 15. CD 8/26.

Doran Constr. Co., Ltd., 5 Concord St., Ottawa, Ont., CA **$800,000.** NOVITATE and SCHOLASTIC BLDG., Base Line Rd., east of Merivale Rd., OTTAWA, ONT. Sisters of Holy Cross, 245 Launier Ave. E. Ottawa, Ont. J. S. Lafort, 86 Greenfield Ave., Ottawa, Ont., archt.

Milne & Nicholls, Ltd., 57 Bloor St. W., Toronto, Ont. CA **$650,000.** BUILDING addn., and altering existing bldg., TORONTO, ONT. Ontario College of Art, Grange Park, Toronto, Ont. Bids Aug. 31, awarded Sept. 15. CD 8/19.

▲ **B. Perini & Sons Canada, Ltd.**, 49 Jackes Ave., Toronto, Ont., CA Est. **$1,750 000.** 12 story, 88x102 ft. rein.-con., steel, brick OFFICE, University Ave. and Adelaide St. W., TORONTO, ONT. Louis Mayzell, 410 Adelaide St. W., Toronto, Ont. Bregman & Hamann, 7 Adelaide St. E., Toronto, Ont., archts. Alex Tobias, 24 Cecil St., Toronto, Ont., engr. Awarded Sept. 15. CD 12/11/53.

AMERICANS ABROAD

HEAVY CONSTRUCTION—BA

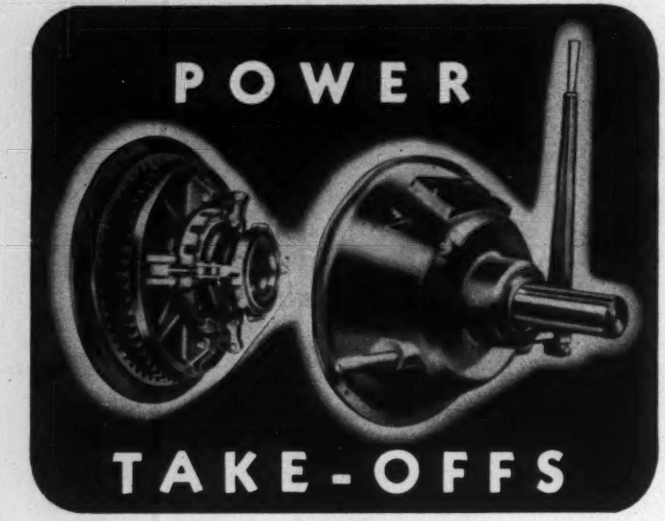
▲ Bids will be taken on the following project under International competitive bidding of NATO.

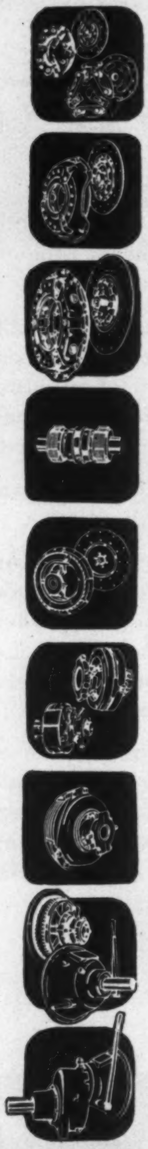
FRANCE

Ministere de l'Industrie et du Commerce, Service Special des Depots d'Hydrocarbures, 85 Boulevard de Montparnasse, Paris, supply pipes for constr. 4 pipe lines: Marseille-Langres (second part from St. Remey to Langres), 520 kilometers 12 in. pipe, est. $9,142,000; Langres-Belfort, 130 kilometers, 8 in. pipe, $1,428,571; Le Havre-Cambrai, 250 kilometers, 12 in. pipe, $4,235,714; Cambrai-Anvers, 55 kilometers, 10 in. pipe, $714,285. Interested firms must file by Oct. 5 separate applications for each pipe line in which interested. Bids will be called for on Oct. 19 and all bids submitted by Nov. 9. For information on bidding NATO projects see 6/25 Construction Daily.

(Proposal Advertisements see pp. 382 to 384)

ROCKFORD





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- SELF CONTAINED UNIT
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- ROLLER BEARINGS
- FINE ADJUSTMENT
- ACCURATE BALANCE
- S.A.E. DIMENSIONS

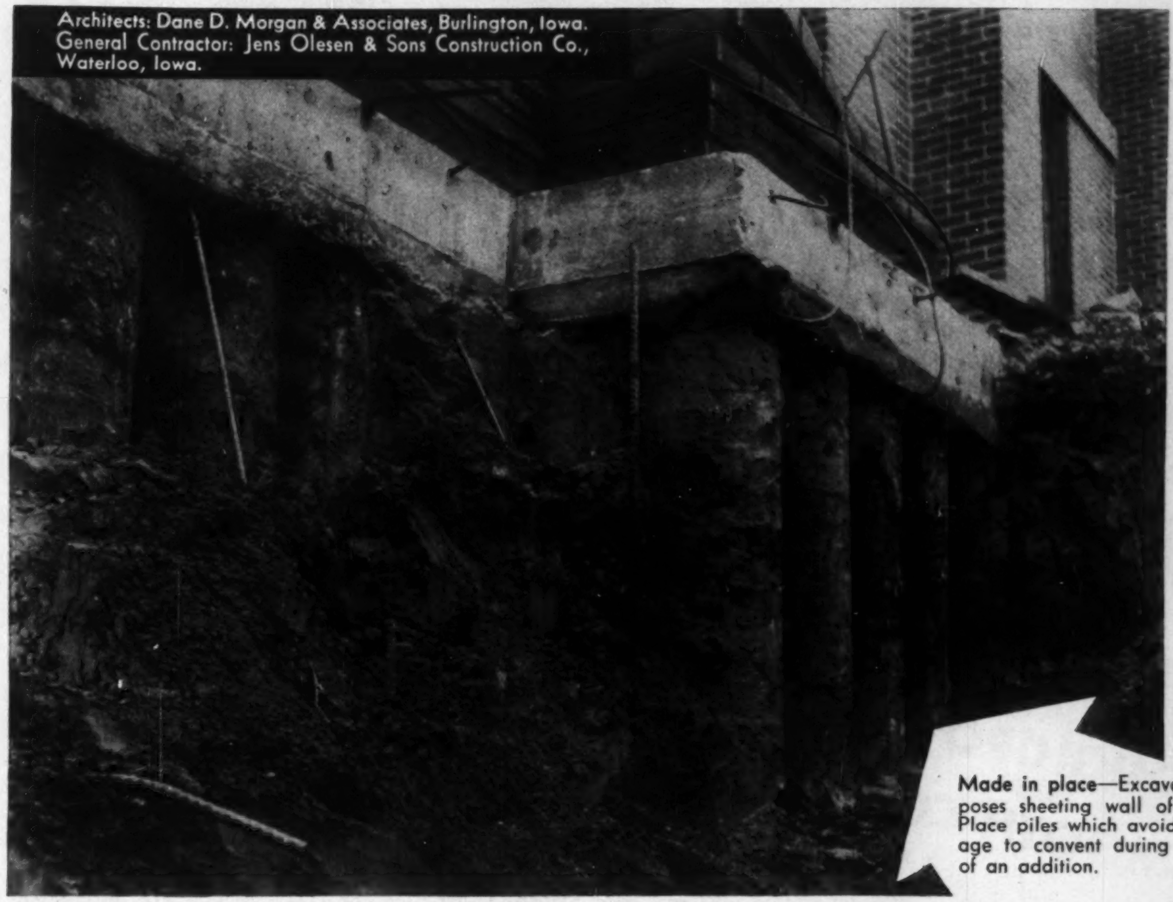
* ROCKFORD POWER TAKE-OFFS are available in standard sizes ranging from 125 foot pounds to 2100 foot pounds torque. Clutch sizes range from 6½ to 18 in. double plate. These complete, self-contained units are suitable for heavy-duty gear-tooth application to current industrial gasoline and diesel engines.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.

ROCKFORD CLUTCH DIVISION BORG-WARNER
▲ 313 Catherine Street, Rockford, Illinois, U.S.A. ▲

CLUTCHES



Architects: Dane D. Morgan & Associates, Burlington, Iowa.
General Contractor: Jens Olesen & Sons Construction Co., Waterloo, Iowa.

Made in place—Excavation exposes sheeting wall of Cast-in-Place piles which avoided damage to convent during building of an addition.

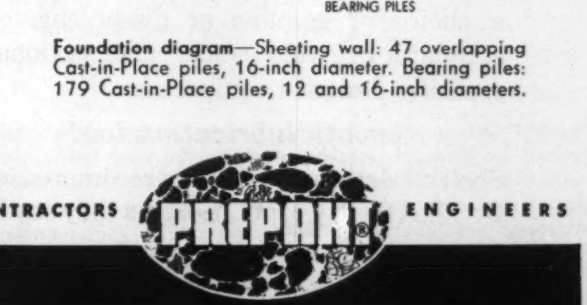
No driving vibration with *Cast-in-Place* piles

▶ Intrusion-Prepakt Cast-in-Place piles—*made in place without vibration*—prevented damage from vibration or ground heaving during construction of an addition to Mt. St. Clare Convent & Novitiate, Clinton (Iowa). Overlapping Cast-in-Place piles placed close to an existing building permitted excavation with no settlement. Others placed to bedrock served as bearing piles.

Cast-in-Place piles are continuous shafts of high quality concrete made by augering holes, then filling these with INTRUSION mortar or with coarse aggregate followed by consolidation with INTRUSION mortar. The result is a pile with maximum frictional and point bearing capacity and without honeycombing, entrapped water or segregation.

Cast-in-Place piles are the practical solution for support piling, underpinning, cofferdamming, shoring and subsoil stabilization in unstable soils where driving vibration endangers nearby installations or where headroom is limited.

You are invited to write on your letterhead for detailed technical literature.



Foundation diagram—Sheeting wall: 47 overlapping Cast-in-Place piles, 16-inch diameter. Bearing piles: 179 Cast-in-Place piles, 12 and 16-inch diameters.

Prepakt maintains a complete field construction organization plus an engineering service, and functions as prime or subcontractor. For further information, write: Intrusion-Prepakt, Inc., Room 779-F, Union Commerce Building, Cleveland.

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Who Will Build the Dallas-Houston Toll Road?

Contest is developing between private group and public authority, as the private group prepares to sell its bonds

J. P. Chamberlain
Associate Editor

Who will build the toll road from Dallas to Houston? The privately-owned Texas Turnpike Co., or the public Texas Turnpike Authority? Will the private group be able to sell its bonds in this tightening money market before the public agency gets legal machinery into action to take over the franchise?

The suspense is building up fast in this toll-road opera. Last week, the authority, which is already building a toll road between Dallas and Fort Worth, authorized Manager J. C. Dingwall to negotiate with engineers for a recheck of the feasibility of the private financing of the Dallas-Houston route.

• **Recheck**—The board is thinking of engaging Coverdale & Colpitts, New York engineering firm. Its survey would go over the existing engineering and traffic data, compiled by the New York engineering firm of Parsons, Brinckerhoff, Hall & Macdonald, and the Chicago firm of De Leuw, Cather & Co.

Some lawyers say the Turnpike Authority has general powers to build toll roads anywhere in Texas—though others think it would have to go back to the legislature for specific authority. At any rate, if the recheck finds that a privately-financed pike between Dallas and Houston is not feasible, the authority could move to take over financing and construction of the facility. Or the recheck might show that certain segments of the route are feasible, perhaps a stretch north from Houston, or from Dallas to Waco.

• **Lehman offer**—The New York investment firm of Lehman Brothers, financial adviser to the authority, has offered to put up the money for the recheck, along with First Boston Corp. and First Southwest Co. In return, the three firms ask for the privilege of getting first crack at negotiating an arrangement to underwrite bonds the authority would sell. If this is arranged, Lehman would resign as financial adviser.

Meanwhile, the private group says it will offer $130 million of bonds to finance a 210-mi. pike within the next few weeks, through a syndicate headed by Glore, Forgan & Co. of New York and Chicago. Glore, Forgan says that the move by the other group is "an attempt to get our deal off balance"—in other words, to hurt the marketability of the bonds.

• **Skeptical**—However, in Wall Street this week most observers were skeptical about the private group's bond issue. An attempt to sell bonds failed last February, when the bond market was stronger. These bonds would be exempt from federal income tax, but unlike publicly-owned toll roads, the property would be subject to local property taxes.

• **Special setup**—The Glore, Forgan syndicate has arranged a special setup to sell the bonds, similar to the financing that in late 1953 finally put over the often-deferred Mackinac Bridge financing.

The bonds will be set up like this: There would be $90 million of 4% Series A bonds, which would get first call on all revenues left after operation and maintenance costs. Next would come $40 million of 4¾% Series B bonds. No more of the Series A bonds could be issued to finance any further construction. Because of this closed-end feature, and because of the high coupon rate, the underwriters hope that enough institutional investors will line up to buy the Series A bonds.

Glore, Forgan believes it already has individual investors lined up to buy the very speculative Series B bonds. Buyers of these bonds are taking a risk that there would not be enough revenue left to pay full interest after servicing the Series A bonds. But for a wealthy investor, the potential yield of 4½% is the same as a much higher yield on taxable securities.

• **Route**—The private group's toll road would run from a point near Dallas to a point about 10 mi. north of Houston. Due to good feeder roads in both metropolitan areas, engineers have decided that it is not necessary to bring the pike any closer in.

You probably will get the answer to this cliff-hanger within a few weeks. If the private Texas Turnpike Co. offering fails now, it seems likely that the authority will eventually build the toll road.

How Contractors Did in the First Half

	Sales		Profits	
	1955	1954	1955	1954
Arundel	$10,486,279	$7,931,577	$592,731*	$293,450
Fluor**	58,081,078	42,943,886	698,191	345,532
Great Lakes Dredge	NA	NA	325,094	D142,050
Merritt-Chapman	162,339,184	60,443,519	3,611,462	1,121,852
Morrison-Knudsen	66,179,000	66,138,000	2,546,743	1,640,412

* Includes price adjustment for prior years and other non-recurring income. Otherwise, net income would have been below the 1954 period.

** Six months ending July 31.

D—deficit.

Few U. S. contractors report annual sales and earnings to the public. And fewer still report quarterly and semi-annual results. The table (above) shows only a handful of first-half sales and earnings.

From these few figures, it is difficult to draw any general conclusions as to how contractors as a whole were doing in the first half of this year. However, cost and price indexes for the first six months of the year indicated that the prices contractors were charging for their work were rising faster than their costs (ENR Aug. 11, p. 160).

The figures shown in this table bear out the indexes, for most of the firms listed increased their sales. And—what is even more encouraging—they increased their profit margins. In other words, their earnings increased at a faster rate than their sales.

Merritt-Chapman's fast gain is of course largely accounted for by mergers of other companies. And Arundel's pickup in profits was the result of nonrecurring earnings.

In general, however, these figures give a rather optimistic picture.

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Management Change at M-M May Lead to Sale or Merger

A dissident stockholders group last week succeeded in getting control of Minneapolis-Moline Co. away from the present management. This may lead to sale or merger of the firm.

Since July, a stockholders group led by Edward S. Reddig, executive vice-president of White Motor Co., has been trying to take over. Now a favorable opinion by the Securities & Exchange Commission has cleared the way.

SEC ruled that the management was legally bound to mail out to stockholders the proxy material of the insurgent stockholders' committee. That decided the management group, headed by President Warren C. MacFarlane, that any further fighting would serve no useful purpose.

Now Reddig is in as board chairman, with six other directors of his group, or seven out of 10 seats. MacFarlane will remain as president and as director. According to Reddig, there will be no change in top management. While his group stated early in the management fight that its purpose was to sell or merge Minneapolis-Moline, Reddig says his group has "no definite ideas as yet."

Reddig is most emphatic that there will be no merger with White.

AEC Will Accept Proposals For Small Private A-Plants

The Atomic Energy Commission has just announced the second phase of its aid program to private A-power plants. This week, it asked utilities, equipment makers, and others to submit proposals for plants in one of three ranges: 5,000 to 10,000 kw; 10,000 to 20,000 kw; and 20,000 to 40,000 kw. The deadline is Feb. 1, 1956.

This phase of the program is intended to develop data on the value of small power reactors for commercial use. And, of course, it's hoped atomic technology will be advanced in the process.

AEC can give outright financial aid—as it is giving to the first big A-plant now under construction at Shippingport, Pa. (ENR Sept. 15, p. 23)—or it can lend nuclear fuel without charge, lend the use of its laboratories for research and development, and pay for technical and economic data resulting from design, construction, and operation of the plant.

(*B&F continued on page 376*)

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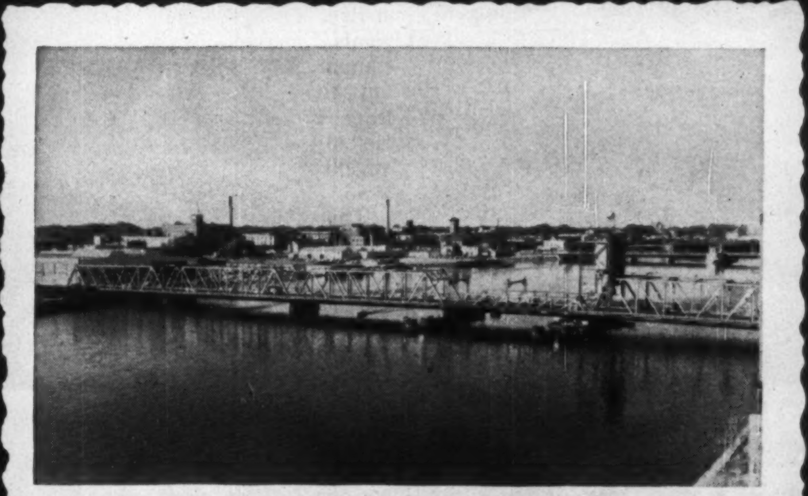

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From our bulletin no. 96-A

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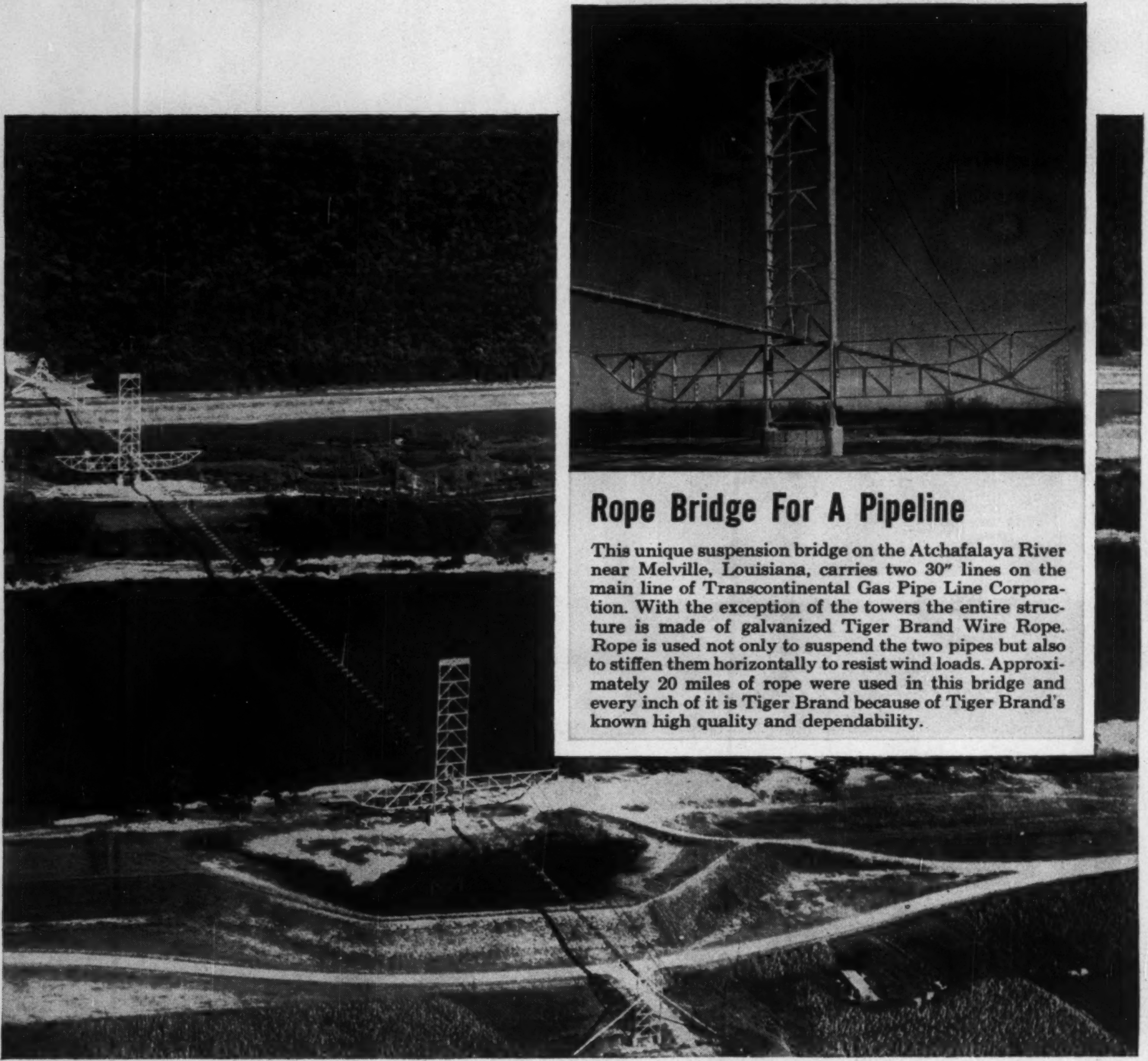

Rope Bridge For A Pipeline

This unique suspension bridge on the Atchafalaya River near Melville, Louisiana, carries two 30" lines on the main line of Transcontinental Gas Pipe Line Corporation. With the exception of the towers the entire structure is made of galvanized Tiger Brand Wire Rope. Rope is used not only to suspend the two pipes but also to stiffen them horizontally to resist wind loads. Approximately 20 miles of rope were used in this bridge and every inch of it is Tiger Brand because of Tiger Brand's known high quality and dependability.

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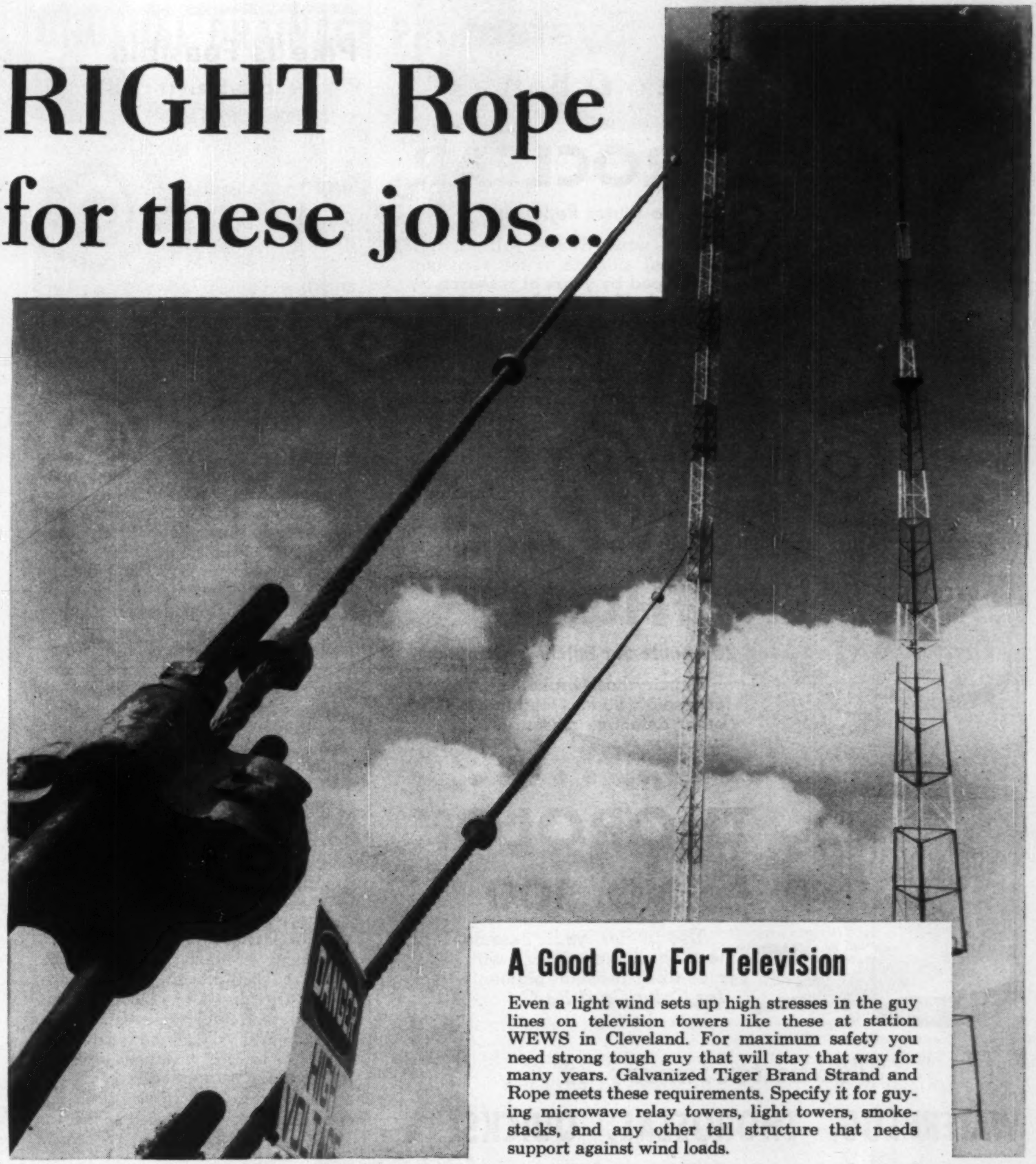

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Pike Is Feasible

Seattle-Everett toll road gets engineers' approval

Last week, as a local court began hearing evidence on legality of the state law authorizing a $227-million toll road from Tacoma, Wash., through Seattle to Everett, the State Toll Bridge Authority received its final report from the New York engineering firm of Coverdale & Colpitts on revenue estimates for the 65-mi project.

The report was favorable, slightly more optimistic than a preliminary estimate made last February. It figures that the toll road would be self-supporting in its second year.

• Could open in 1959—If the courts uphold the enabling act, condemnation for the route is expected to begin early next year, with construction scheduled to start later in 1956. Completion is scheduled for 1959, when initial revenues of $10.2 million are expected. After maintenance and operation costs, the report estimates that about $7.8 million would be available for debt service, which is estimated at $7,945,000 on 30-year bonds drawing $3\frac{1}{2}\%$ interest. The difference could be made up from a $5-million contingency guarantee from the motor-vehicle fund authorized by the state legislature this year.

In the second year of operation, net revenue available for debt service is estimated at over $9.3 million, well in the black. Gross revenue, before maintenance and operation is expected to reach a peak of $23.5 million by 1988.

• Major traffic route—The largest movement of traffic on the route would be between the Seattle business district, just a few blocks off the highway, and the residential district to the north. This would require a high-level bridge. About one-third of total revenue is expected here. Traffic on the tollway in downtown Seattle is estimated at 69,300 vehicles daily in 1960.

• Barrier stations—Daily movement for the whole length of the route, according to the report, is likely to be only about 720 vehicles. Another 7,700 will get a free ride daily on sections between pay stations. The report figures that a driver going the whole 65 mi would save $1\frac{1}{2}$ mi and $27\frac{1}{2}$ minutes, in spite of seven stops at barrier stations.

(*B&F continued on page* 378)

Felker Concrete Cutter SOLVES UNUSUAL DRAINAGE PROBLEM

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Two cuts, 3" deep and ½" deep, are made around trench locations with this Felker Model 200 Concrete Cutter using a 14" Felker Segmented Type Diamond Blade.

Concrete between the deep and shallow cuts is chiselled out to form a ledge. NOTICE how it supports the steel cover plate.

Felker concrete cutting machines fulfill a wide scope of applications—on streets, sidewalks, highways and wherever paving exists. This interesting application of a Felker model 200 saw solved a difficult problem at nominal cost . . . again proving the economy and feasibility of sawing versus breaking out.

Surface oil deposits seeping through cracks in concrete paving created a neighborhood nuisance in this service station. Since the tar was too heavy to dispose of in the sewers, drainage pits proved the only answer. These were constructed by sawing through the concrete to reach the oil strata beneath. A ledge was chiselled between the pit and an outside cut to support steel cover plates. The completed job presented a neat, clean, safe surface and only periodic removal of the tar is required. The same idea appears practical for controlling wet basements and other water bearing pavement.

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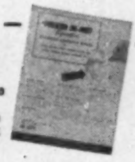

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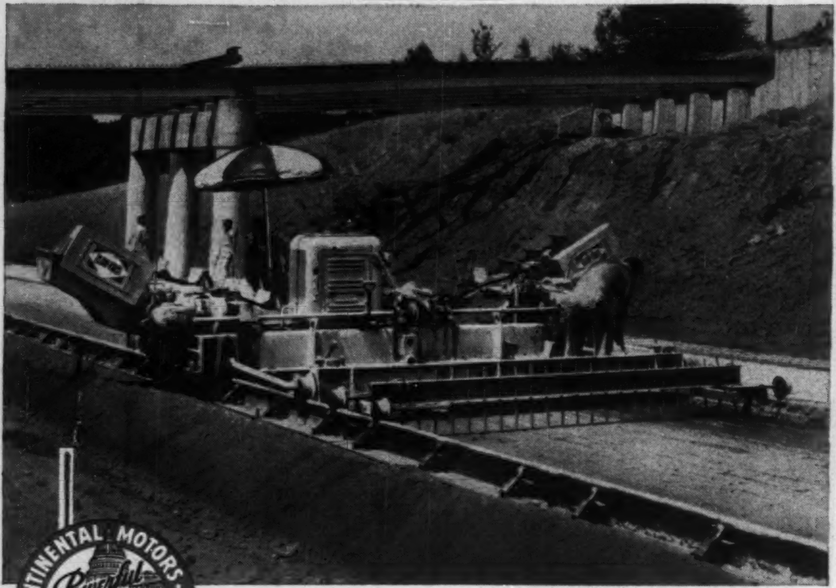

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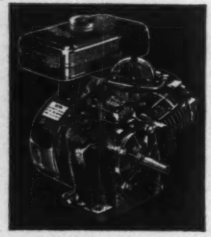

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Low Grading, Drainage Bids Pay for Toll Road Extension

The Florida Turnpike Authority will go ahead with its plan to add 6½ mi to the southern end of the "Bobtail" turnpike between Hollywood and Ft. Pierce, bringing it closer to Miami and helping to relieve that city's already overloaded highways (ENR Sept. 1, p. 26).

Although it has so far awarded grading and drainage contracts on only 62 mi of the original 110-mi route, the authority has already saved just about enough money to pay for the $3.5-million extension. Contracts let up to Sept. 1 averaged 61% of engineers' estimates. They totaled about $5.3 million, a saving of nearly $3.4 million.

- **Other extras**—The authority also said last week that it has $2¼ million of extra money in the form of bond discount, in the difference between estimated interest during construction and the actual lower interest rate being paid during construction, and income from reinvestment of its borrowed funds. There is also a $6½-million contingency fund.

Traffic engineers estimate that extending the toll road will add at least another $400,000 more gross revenue in the first full year's operation.

Business Briefs . . .

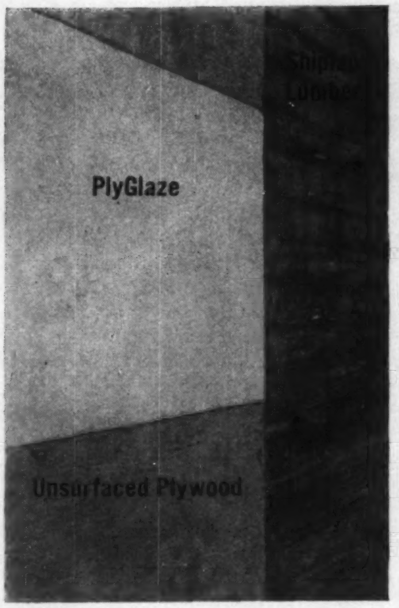
- **Sears, Roebuck** plans to spend $56 million on construction in 1956, about $14 million more than in 1955. Next year's program will bring the total amount spent on retail construction to $400 million since World War II.

- **Unfilled orders** of the Douglas fir lumber industry declined from 822,965 Mftbm at the end of July to 766,700 at the end of August, according to the West Coast Lumbermen's Assn.

- **New York Thruway** revenues in August were up 3.8% from July. Revenue from commercial vehicles was up 23.6%.

- **Hydro plant**—Portland (Ore.) General Electric Co. expects to build a $19-million hydro plant of 75,000 kw capacity on the Clackamus River about 30 mi east of Portland.

- **B-I-F Industries, Inc.**, of Providence, is no longer making water-pipe fittings. That part of its business has been sold to Warren Pipe & Foundry Co., Boston.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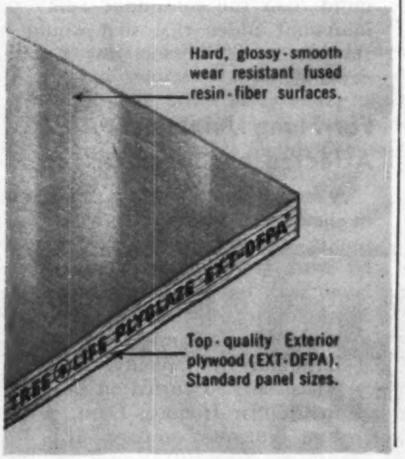
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Activity This Week

As reported to ENR
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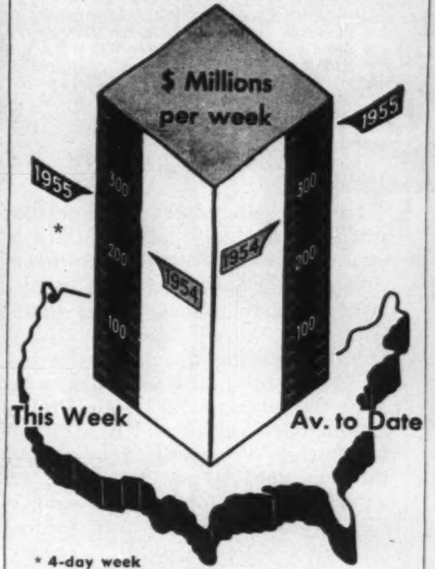


* 4-day week

Amount of contracts let

(millions of dollars)

		Cumulative 39 wks		
By Ownership	This Week*	1955	1954	% chge
Federal	$37.1	$1,289.1	$920.5	+40
State and municipal ...	74.7	4,053.1	3,738.9	+8
Total public....	111.8	5,342.2	4,659.4	+15
Total private...	154.3	8,792.0	6,168.8	+43
U. S. Total....	$266.1	$14,134.2	$10,828.2	+31
By type of work				
Waterworks	$3.8	$205.1	$175.2	+17
Sewerage	3.4	301.0	281.7	+7
Bridges	12.2	358.8	389.1	−8
Highways	33.7	1,662.1	1,443.4	+15
Earthwork, waterways ...	27.0	406.5	207.0	+96
Buildings:				
Public excl. hsg.	28.8	1,311.7	1,324.3	−1
Public housg..	..	220.5	183.0	+20
Private housg.	72.5	4,777.7	3,210.8	+49
Commercial ..	16.6	1,272.7	1,013.9	+26
Industrial ...	62.4	2,055.2	1,455.2	+41
Unclassified	5.7	1,562.9	1,144.6	+37
U. S. Total....	$266.1	$14,134.2	$10,828.2	+31

* 4-day week

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

New capital for construction

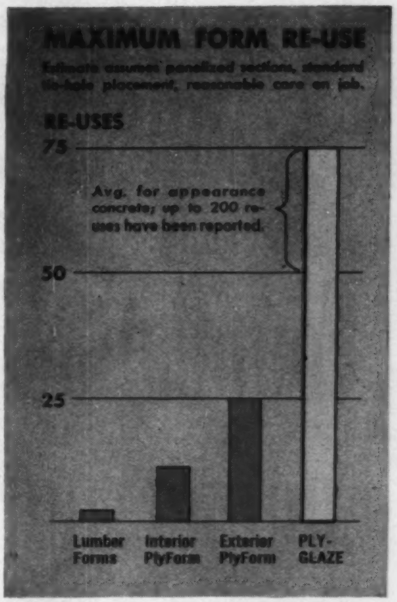
(millions of dollars)

		Cumulative 38 Wks	
	Week of Sept. 22	1955	% Chge '54-'55
Corporate securities......	$99.3	$2,498.7	+15
State and municipal:			
All except housing.....	59.9	2,995.9	−25
Housing	...	72.0	−21
Federal loans	12.4	104.6	+14
Federal aid	...	835.5	+27
Total nonfederal	$171.6	$6,524.6	−7
Federal appropriations:			
In U. S.............	...	$3,379.7	+63
Outside U. S.........	...	84.6	+155
Total new capital........	$171.6	$9,988.9	+9

ENR cost and volume indexes, 1955

		Base years = 100		
		1913	1926	1949
Construction cost ...	9/22	673.40	323.70	141.17
	9/1†	672.80	323.41	141.04
Building cost	9/22	480.02	259.48	136.45
	9/1†	479.21	259.05	136.22
Volume	Aug.	508	207	147
	July	699	284	202

† Official ENR Indexes for Sept.



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LABOR

GAW Rolls Along

Big gains made by CIO as labor seeks security

Last week the scoreboard for guaranteed annual wage plans showed a total of 71 firms whose new contracts with the UAW-CIO contain supplemental unemployment benefit provisions.

In announcing the progress it has made since the June 6 settlement with Ford, the International Union, United Automobile, Aircraft and Agricultural Implement Workers of America said the plans now cover 867,200 members —nearly 60% of the union's membership. With additional contracts now under negotiation, it added, thousands more "will also be able to enjoy the protection of GAW in the near future."

According to reports received by ENR, the construction industry has not yet noticed any significant effects of this GAW momentum, although both labor and management are giving it increased attention (see page 144). Some members of the industry feel it will hit construction soon, and say it has already made the building trades more "cocky" and has contributed to higher wage boosts for the unions.

A spokesman for one of the Building and Construction Trades Councils summed up the GAW impact this way: "I think the guaranteed annual wage has influenced building trades unions to some extent. It has brought discussion, although nothing has developed. It will happen eventually, but the construction industry usually lags behind the others because of problems of application."

Among the companies included in last week's UAW tally are many that produce construction equipment—International Harvester. Caterpillar, Allis-Chalmers, John Deere, White Motor, Midland Steel and Borg-Warner, to name a few. The agreement with Allis-Chalmers, considered an improvement over the Ford pattern, accelerates the building up of credit units and provides for benefits of 65% of take-home-pay for laid-off workers for 26 weeks.

Meanwhile, various steps have been taken to facilitate operation of the plans. Rulings have been obtained in Michigan, Massachusetts and Connecticut to permit payment of GAW benefits without prejudice to unemployment insurance compensation. In Maryland, efforts—vigorously protested by the Associated Builders and Contractors of Maryland—are underway to amend the state unemployment insurance law to accommodate GAW plans. Labor Secretary Mitchell has ruled that company contributions for overtime hours are payable at straight time. And deductibility of employer contributions for federal income tax purposes is under consideration by the Internal Revenue Service.

Canadian Workers Enjoy Employment Boom in West

Construction employment in British Columbia (ENR Aug. 25, p. 81) still rolls along at a postwar high.

In one of the most confident reports ever released by the Vancouver Building Trades Council, 10,000 carpenters are reported at work with many more skilled men needed. Heavy residential, commercial and industrial building has practically every skilled tradesman working.

"There's no doubt it's the best year we've ever had since the war's heavy demands on construction men," said Ed Kennedy, BTC secretary. "The large amount of construction started this past summer should tide us over the winter and cut down the number of unemployed."

All plumbers and painters are working; carpenters—"could use another 100 in Vancouver and New Westminster alone"; the plasterers, floorlayers' and lathers' unions have been short of skilled men for two years and claim they can not get enough apprentices to keep up with the demand; and there is a shortage of sheet metal workers.

In Victoria, E. T. Staley, secretary of the Provincial Council of Carpenters, said the shortage of skilled carpenters may force employers to pay more than the minimum $2.25 per hour—but added that that would be the employers' choice, not a union demand.

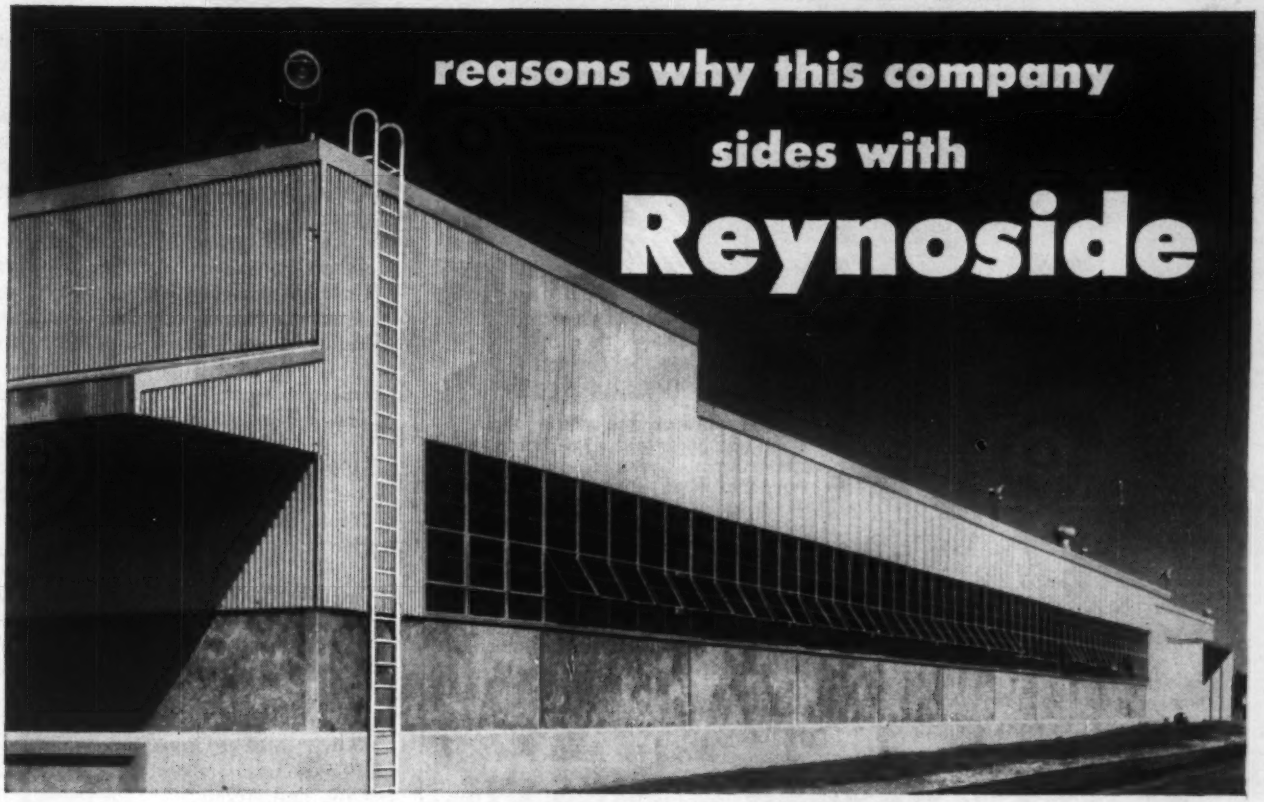
Far-Flung Joint Ventures Affected by Labor Dispute

A jurisdictional dispute that arose in Tennessee with a Minnesota contractor was reported to have touched off work stoppages in Kentucky and New York on projects in which the Minnesota contractor had an interest as member of a joint venture.

Simultaneous walkouts, referred to as "vacations," occurred on the multimillion dollar Iroquois Dam, part of

(*Continued on page* 382)

"Low-Cost and Maintenance-Free"...

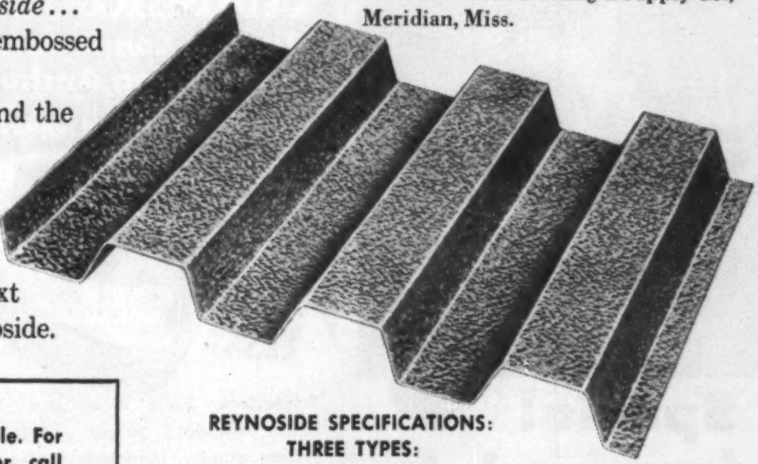


reasons why this company sides with Reynoside

Architect:
John Turner, Jackson, Miss.

Jobber-Erector:
Nathan Daniels Roofing & Supply Co.,
Meridian, Miss.

Low applied cost and low maintenance (no painting) are the principal advantages cited by Century Mfg. Co. of Jackson, Miss., for *Reynoside*... Reynolds *Lifetime* Aluminum ribbed-embossed siding. You can see another advantage in the photo... modern appearance. And the workers know still another... better year-round temperatures, because aluminum reflects radiant heat. Give this rustproof, corrosion-resistant material full consideration for your next building. Write for literature on Reynoside.



REYNOSIDE SPECIFICATIONS:
THREE TYPES:
(A) 4" rib, .032" thick. (B) 8" rib, .032" thick. (C) 8" rib, .040" thick. Rib depth, 1".
Finish: Stipple-embossed.
Lengths: From 5' to 14' 5½". Special lengths to order.
Width: 41⅝" over-all; nominal coverage 40".
Weight per square: (A) 59.4 lbs.
(B) 53.1 lbs. (C) 66.4 lbs.

A complete installation service is available. For name of nearest franchised jobber-erector, call the Reynolds office listed under "Building Materials" in classified phone books of principal cities. Or write to Reynolds Metals Company, Building Products Division, 2009 South Ninth Street, Louisville 1, Kentucky.

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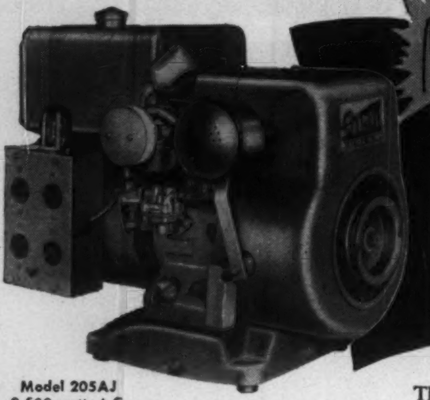
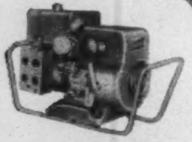
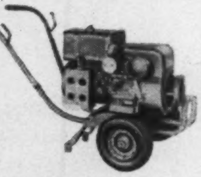


New ONAN Portable ELECTRIC PLANTS

Model 205AJ
2,500 watts A.C.



CARRYING FRAME for hand lifting and moving.



TWO-WHEEL DOLLY for easy moving by one man,

Put more power on the job!

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Onan Portable Electric Plants: 500 to 5,000 watts.

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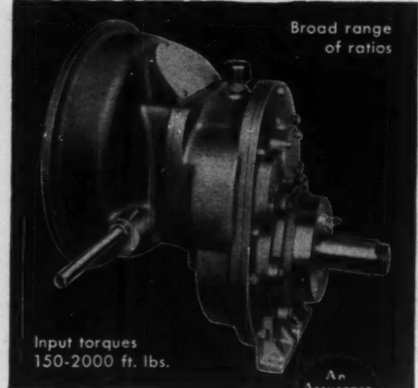

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BEATRICE NEBRASKA

the St. Lawrence power project, under construction near Point Rockaway, N. Y., and on the reconstruction of Green River's Lock No. 1, near Spottsville, Ky. Picket lines were not established. Sources at the sites said they didn't know what caused the stoppages.

The walkout at the New York project was complete and lasted two days. Crafts that participated include teamsters, carpenters, laborers, operating engineers, electricians and millrights. All the key construction workers were reported to be employes of Peter Kiewit Sons Co. of Omaha, one of the members of the joint venture. Other members are Arthur A. Johnson Corp. of New York and the Minnesota firm—Al Johnson Construction Co. of Minneapolis.

Members of five unions—operating engineers, carpenters, laborers, teamsters, and ironworkers—walked out on the Kentucky project. Contractors are Peter Kiewit Sons and Al Johnson Construction Co.

Also affected were another Johnson-Kiewit project in Minneapolis and three Johnson projects in Minnesota, Ohio and Arkansas.

Labor Briefs . . .

• **Boost for carpenters**—In Eau Claire, Wis., the Chippewa Valley Contractors' Assn., has signed a one-year contract with the District Council of Carpenters, granting a 20-cent wage boost and ending a four-week strike.

• **New building code?**—The Kentucky State Council of Carpenters has voted to seek enactment of a state carpentry and materials code for home builders. Particularly noting use of scrap materials in new homes, a council spokesman said, "The general public has been cheated . . . in the construction of residential property."

• **Welfare funds**—The State Insurance Commissioner in Washington is about to mail questionnaires, returnable Nov. 1 and open to public inspection, to all welfare fund administrators and insurance companies. After replies have been evaluated, an investigation of funds will be made.

• **Asbestos workers** — New journeyman's rate for asbestos workers in Kentucky and southern Indiana is \$3.22½ as a result of a two-year contract with the Master Insulators Association of Louisville and Lexington. Members of Local 51 get a 12½-cent boost now, with another 10 cents next September.

OFFICIAL PROPOSALS

Bids: October 25, 1955

Contract NYA-590.004

ADVERTISEMENT

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
CARGO BUILDING NO. 84

Sealed proposals for the construction of Cargo Building No. 84 at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, October 25, 1955, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1112. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to Room 1112, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, September 29, 1955

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Bids: October 25, 1955

Contract LT-160.015

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THE PORT OF NEW YORK AUTHORITY
LINCOLN TUNNEL—THIRD TUBE
WIDENING VIADUCT IN NORTH
BERGEN, N. J. SUPERSTRUCTURE

Sealed proposals for widening the viaduct between State Highway Route Number 3 and Prospect Avenue, North Bergen, N. J., on the approach to the Lincoln Tunnel will be received at the office of the Chief Engineer of the Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, October 25, 1955, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1112. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to Room 1112, where the documents will be furnished.

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THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, September 29, 1955

Bids: October 25, 1955

Contract EXD-130.022

ADVERTISEMENT

THE PORT OF NEW YORK AUTHORITY
PORT AUTHORITY BUILDING
SECOND FLOOR ALTERATIONS

Sealed proposals for performing alterations to the second floor of the Port Authority Building at 111 Eighth Avenue, New York 11, N. Y. will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, October 25, 1955, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1112. Documents will be furnished upon deposit of $50.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $50.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasurey Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to Room 1112, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, September 29, 1955

Bids: October 18, 1955

Contract NYA-650.010

ADVERTISEMENT

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
INTERNATIONAL ARRIVAL BUILDING
AND AIRLINE WING BUILDINGS
FOUNDATIONS

Sealed proposals for constructing foundations for the International Arrival Building and Airline Wing Buildings at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, October 18, 1955, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1112. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to Room 1112, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, September 29, 1955

Prequalification Date: October 4, 1955

Board of Education
Bureau of Construction

Notice Re Prequalification Forms for Contractors.

NOTICE IS HEREBY GIVEN THAT THE Director of the Bureau of Construction, Fourth Floor, 42-15 Crescent Street, Long Island City 1, New York, will receive applications for prequalification of bidders, from contractors who may wish to submit bids for the proposed hereinafter specified contracts, as follows:

For (1) general construction, (2) plumbing and drainage, (3) heating and ventilating, (4) electrical work and lighting fixtures for the following schools:

BOROUGH OF QUEENS

Public School 73, 54th Ave. & 71st St., Maspeth, Modernization of existing building & Conversion to a Junior High School. Junior High School 189, 147th St. between Barclay & Sanford Aves., Flushing, new building.

BOROUGH OF BROOKLYN

Public School 58, Smith St. between Carroll St. and First Place, new building. Junior H.S. 278, Stuart & Fillmore Aves., new building. Public School 262, Underhill Ave. between Bergen St. & St. Marks Ave., new building.

BOROUGH OF RICHMOND

Public School 44, 80 Maple Parkway, Mariners Harbor, New Addition to & Modernization of existing building.

Prequalification application forms will have to be secured and must be submitted to the Director, Bureau of Construction office, 4th Floor, Room 407, 42-15 Crescent Street, Long Island City 1, New York.

Bids will be received from prequalified bidders only.

The time for submitting prequalification application forms for the above contracts will expire on Tuesday, October 4th, 1955.

WILLIAM H. CORREALE
Director

Dated: September 16th, 1955

Bids: October 19, 1955

Power Authority of the State of New York

ST. LAWRENCE POWER PROJECT
ADVERTISEMENT FOR PROPOSALS
FOR
THE FURNISHING AND DELIVERY OF
GANTRY CRANES AND TRAVELING
CRANE FOR
BARNHART ISLAND POWER PLANT
SPECIFICATION NO. PA-5-15050
ST. LAWRENCE CONTRACT NO. P20

NOTICE TO CONTRACTORS: THE POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the design, manufacture, and furnishing of one 300 ton gantry crane, one 90 ton gantry crane, and one 150 ton traveling crane and delivery thereof f.o.b. destination as follows:

(1) If delivered in person on the day of receiving bids, until 10:30 A.M. Eastern Daylight Saving Time on the 19th day of October 1955, in Hearing Room C on the 6th floor, 270 Broadway, New York 7, New York.

(2) If mailed in, until 10:15 A.M. Eastern Daylight Saving Time on the 19th day of October, 1955 at the Authority's Office, 270 Broadway, Room 1300, New York 7, New York.

The proposals will be publicly opened and read aloud at the time and at the address given in (1) above.

Bids will be entertained for any one, any two, or all three of the cranes, in accordance with the bidding schedules. Erection at the site of installation will be done by Others.

Plans, specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and the Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, may be inspected by prospective bidders during office hours and may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, upon application and prepayment of a fee of Twenty ($20.00) dollars per initial set of contract documents and Ten ($10.00) dollars per set for additional sets, no part of which will be refunded. Two sets must be returned with each bid.

Bids must be made in duplicate upon the proposal forms included in and bound with the Contract Documents. A bid deposit will be required with each bid in an amount not less than 10 percent of the maximum price bid for any bid schedule.

Bids will not be restricted to American manufacturers.

The right is reserved to reject any and all bids.

W. S. CHAPIN
GENERAL MANAGER

Bids: October 10, 1955

Construction of Pumping Station and Office Building

ADVERTISEMENT

Notice is hereby given that sealed bids will be received in accordance with the law by the Hampton Roads Sanitation District Commission, until three P. M., Eastern Standard Time on the tenth day of October, 1955 at the office of the Commission, Board of Trade Building, Norfolk, Virginia, for furnishing materials and performing the labor for constructing a combined sewage pumping station and office building including connecting gravity, bypass and force main sewer lines at the corner of Plume and Atlantic Streets, all in accordance with the plans and specifications prepared by Buck, Seifert and Jost, Consulting Engineers, 112 East 19th Street, New York 3, New York.

Copies of the plans and specifications may be obtained either from the Commission or from the Consulting Engineer upon deposit of Forty ($40.00) Dollars, which sum will be refunded upon return of the plans and specifications in good condition within ten (10) days after the date on which bids are received or else the entire deposit will be forfeited.

Each proposal must be accompanied by a certified check in amount equal to one (1%) percent of the proposal, together with a bid bond in amount equal to ten (10%) percent of the proposal. The checks and bid bonds of all except the three lowest bidders will be returned within three (3) days after the opening of the bids while the remaining checks and bid bonds will be returned as soon as the contract has been executed. The certified check and bid bond of the successful bidder will be retained to pay for any damage or loss to the Commission in case such successful bidder shall neglect or refuse to enter into a contract in accordance with his proposal.

The Commission reserves the right to consider bids for fifteen (15) days after their receipt before awarding any contracts and the right is reserved to accept any bid or to reject any or all of them.

E. T. Greshan, (Chairman)
J. V. Morris (Vice Chairman)
G. A. Treakle
M. B. Wagenheim
Clark R. Nickerson
COMMISSIONERS, HAMPTON ROADS SANITATION DISTRICT COMMISSION
Charles B. Borland, Manager
Buck, Seifert and Jost
Consulting Engineers

Bids: October 28, 1955

Construction of Sewerage Treatment Works

NOTICE TO BIDDERS

Sealed proposals for the construction of Additional Sewers and New Sewage Treatment Works will be received by the Board of Sewer Commissioners of Hamilton College Sewer District at their office at Hamilton College, Clinton, New York, until four o'clock P.M., E.D.T. on the 28th day of October, 1955.

Information for bidders can be obtained at the office of William S. Lozier Company, Engineers, 10 Gibbs Street, Rochester, New York. Copies of plans may be obtained upon the payment of Ten Dollars ($10.00) for each set, which will not be refunded.

The work consists of Section "A", the construction of approximately 6,000 feet of 8" sanitary sewer and 3,000 feet of 12" sanitary sewer and Section "B", a sewage treatment plant consisting of brick building, comminutor, clarifier, digestion tank and sludge bed with appurtenances.

BOARD OF SEWER COMMISSIONERS
Norman G. Lewis, Secretary
September 29, 1955

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4479) will be received at Rock Springs, Wyoming, until November 1, 1955, for furnishing labor and materials for earthwork and structures for Eden laterals, sublaterals, drains, and wasteways, Eden Project, Wyoming. Location near Eden, Wyoming. Principal items are 604,000 cu. yds. excavation; 123,000 cu. yds. earth lining; 1,290 cu. yds. concrete in structures; 5,600 lin. ft. concrete pipe, 18- to 66-inch; and other work. Completion time 960 days. For particulars, address Bureau of Reclamation, P.O. Box 944, Rock Springs, Wyoming; or Building 53, Denver Federal Center, Denver 2, Colorado, W. A. Dexheimer, Commissioner.

BUREAU OF RECLAMATION NORTH PLATTE RIVER PROJECTS 91255-P4 CASPER, WYOMING UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION NOTICE IS HEREBY GIVEN that sealed bids on Specifications No. 703C-384 for furnishing all labor, equipment, and materials and performing all work for COMPACTED EARTH LINING FOR CASPER CANAL, STATION 1164+00 TO STATION 1194+00, STATION 2038+00 TO STATION 2043+00, AND STATION 2073+50 TO STATION 2087+00, Kendrick Project, Wyoming, will be mailed to Box 280, Casper, Wyoming or delivered to the office of the Bureau of Reclamation in time for the public opening at 10:30 a.m., Mountain Standard Time, October 11, 1955, at the office of the Bureau of Reclamation Center, Casper, Wyoming.

Copies of the standard forms and of the specifications may be obtained from the following offices of the Bureau of Reclamation: R. J. Walter, Jr., Regional Director, Building No. 46, Denver Federal Center, Denver, Colorado; and I. J. Matthews, Projects Manager, Box 280, Casper, Wyoming. No charge for copies of the specifications and drawings furnished for bidding purposes; for all others $0.50 per copy, not returnable. Payments should be made by check or money order payable to the Treasurer of the United States.

I. J. Matthews

U. S. Government

NAME AND LOCATION OF PROJECT—Project No. 53-103, Additional Section of Intercepting Sewer Charlotte Amalie, St. Thomas, Virgin Islands. DEPARTMENT OR AGENCY—OFFICE OF TERRITORIES, DEPARTMENT OF THE INTERIOR, by (issuing office) Division of Insular Affairs, Office of Territories, Department of the Interior, Room 6412 Interior Building, Washington 25, D. C. Sealed bids in single copy for furnishing all labor, equipment, and materials and performing all work for the project described herein will be received until 3:00 P.M. Atlantic Standard Time, October 20, 1955, in the Office of the Director, Virgin Islands Public Works, Division of Insular Affairs, Office of Territories, Department of the Interior, Charlotte Amalie, St. Thomas, Virgin Islands and then publicly opened and read aloud. Information regarding bidding material, bid guarantee, and bonds, plans and specifications and other proposed contract documents are open for public inspection at the office of the Director, Virgin Islands Public Works, Division of Insular Affairs, Office of Territories, Department of the Interior, Charlotte Amalie, St. Thomas, Virgin Islands; R. L. Kenan & Associates, Consulting Engineers, Bell Building, Montgomery, Alabama; Lester M. Marx, Room 2713 Interior Building, Washington 25, D. C.; Housing and Home Finance Agency, Room 313 N. Y. Department Store Building, 1064 Ponce de Leon, Santurce, Puerto Rico; A.G.C. Office, 1113 Congress Building, Miami, Florida; Builders Exchange, 46 Northeast 6th Street, Miami, Florida; F. W. Dodge Corporation, 119 West 40th Street, New York 18, N. Y.; and A.G.C. Office at Palm Beach, Florida. Plans and specifications may be procured from the office of R. L. Kenan & Associates, Consulting Engineers, Bell Building, Montgomery, Alabama, upon deposit of $20.00. Deposit shall be only by certified check payable to the Treasurer of the United States, which will be refunded to bona fide bidders upon the return of plans and specifications in good condition within thirty (30) calendar days from the date of bid opening. A bona fide bidder includes any person who submits a bid for a general contract, but does not include a person who submits a quotation to the general contract bidders. To persons who procure plans and specifications upon payment of $20.00 and who do not submit a bid, $15.00 will be refunded upon the return thereof, in good condition, within thirty (30) calendar days from the date of bid opening. No refund will be made for return after that time. Bonds, etc.—Each bid must be accompanied by a satisfactory bid guaranty in an amount not less than 5 percent of the total bid. The successful bidder will be required to furnish a performance bond and payment bond, each in the amount of 100 percent of the contract price. No bid may be withdrawn until thirty (30) calendar days after the scheduled closing time for the receipt of bids. The Government reserves the right to waive any informality and to reject any or all bids, when such is in the interest of the Government. Description of Work—The construction of an additional section of the intercepting sewer, paralleling the existing 18-inch V.C. intercepting sewer, or meandering in the same general direction, from the vicinity of NY Tvaer Gade to the Lift Station near the French Village which includes the following approximate quantities: 1 Reinforced Concrete Grit Chamber, 11 Concrete Manholes (0 to 14 depth), 260 Lin. Ft. 8" Pipe (Hauling and Installing Only), 500 Lin. Ft. 10" Pipe (Hauling and Installing Only), 1,070 Lin. Ft. 18" Pipe (Hauling and Installing Only), 440 Lin. Ft. 20" Pipe (Hauling and Installing Only). The cast iron sewer pipe will be furnished at St. Thomas, Virgin Islands from Government surplus. The majority of trench for 18" and 20" sewer will be in dredged fill and the pipe invert will be approximately 6' to 8' below sea level in trenches 8' to 12' deep.

OFFICIAL PROPOSAL

RATE: $1.80 per line (or fraction) per insertion.

CLOSING DATE: 10:30 a.m. Friday for issue out following Thursday.

SEND COPY: Official Proposal Division, Engineering News-Record, 330 W. 42nd St., New York 36. N. Y.

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

NATIONAL COVERAGE

Positions Vacant
Positions Wanted
Part Time Work

Civil Service Opportunities....
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Selling Opportunities Offered

Employment Agencies
Employment Services
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The advertising rate is $24.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

UNDISPLAYED

$1.80 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS to ENGINEERING NEWS RECORD, 330 W. 42nd St., N. Y. 36, N. Y. for October 13th issue closing October 3rd.

BELT CONVEYOR ENGINEER

Experienced in application and mechanical and structural steel design of belt conveyors and related equipment to bulk materials handling. Excellent opportunity with nationally known manufacturer in Chicago suburban area. Submit resume which will be held confidential.

P-7799, Engineering News-Record
520 No. Michigan Ave., Chicago 11, Ill.

BRIDGE ENGINEERS

Civil Graduates of accredited U. S. colleges. Must have not less than the following experience:

Detailers—2 years structural steel or reinforced concrete detailing.

Designers—4 years responsible work on structural steel and concrete including work on long span bridges.

Mail complete resume together with salary required to:

Howard, Needles, Tammen & Bergendoff
55 Liberty Street New York 5, N. Y.

REFINERY CONSTRUCTION SUPERINTENDENT

WANTED

Submit experience record and photograph
California Location

P-7552, Engineering News-Record
1111 Wilshire Blvd., Los Angeles 17, Calif.

CHIEF CHEMIST

degree and experience in chemical testing of construction materials, cement, asphalt, metals by ASTM & AASHO. Knowledge in use of Spectrophometer desirable, not essential. Location, Gulf Coast. Send complete resume and Sale requirements to Box

P-7808, Engineering News-Record
330 W. 42nd St., New York 36, N. Y.

DESIGN ENGINEERS

Who seek greater earnings and better future opportunities should reply to this advertisement providing they have a minimum of five years experience in heavy structural steel and/or concrete design. Permanent positions.

Here is an opportunity to make full use of your abilities and experiences and receive top earnings.

Our employees know of this advertisement.

Send complete resume to:

P-7820, Engineering News-Record
330 West 42 Street, New York 36, New York

ENGINEERS — DESIGNERS

Chemical - Mechanical - Electrical - Structural - Piping

San Francisco assignment

Recent design experience on petroleum refineries, chemical plants, or related projects. Compensation commensurate with ability. Liberal moving allowances.

Please write furnishing complete chronological experience record and salary history, also full details regarding education, salary desired, businesss and character references.

BECHTEL CORPORATION

220 Bush Street San Francisco 4, Calif.

STRUCTURAL DESIGNERS

Structural Designers who want greater opportunities and diversified experience are needed by a large, progressive engineering company celebrating its fiftieth year of service to industry.

Permanent Positions for Qualified Personnel
Professional Status
Profit Sharing Retirement Plan
Insurance Benefits
Promotion from Within the Company

Please send resume to:

Director of Personnel

THE RUST ENGINEERING COMPANY
575 Sixth Avenue Pittsburgh 19, Pa.

ENGINEEER-LABORATORY DIRECTOR

degree and supervisory experience required. Advanced soil mechanics degree desirable. Must have experience testing soils, concrete, steel, and general construction materials by standard procedures. Location, Gulf Coast. Send complete resume and salary requirements to Box

P-7809, Engineering News-Record
330 W. 42nd St., New York 36, N. Y.

SANITARY ENGINEERS

California offers positions with opportunity for professional advancement. Two years' experience related to treatment and disposal of sewage and industrial waste, plus college engineering degree. Salary $436 to $530. Write today. Dept. A, Recruitment Section, State Personnel Board, 801 Capitol Avenue, Sacramento 14, Calif.

IMPORTANT TEACHING POSITIONS OPEN IN ISRAEL

Technion, Israel Institute of Technology, in Haifa, Israel, proposes to appoint:

Professor of Structural Engineering
Professor of Hydraulic Engineering
Professor of Mechanical Engineering
Professor of Mechanical Engineering with special qualifications in Applied Thermodynamics
Professor of Mathematics

Applicants should have first-rate professional and academic qualifications, be willing to integrate themselves into the life of the country and, in due course, to teach in Hebrew.

Applications with full details should be sent in duplicate, for transmission to Haifa, to the:

AMERICAN TECHNION SOCIETY
1000 Fifth Avenue New York 28, N. Y.

EMPLOYMENT OPPORTUNITIES

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Construction Foreman for firm engaged in extensive sewer, water main and treatment plant facilities. Permanent position in N. Y. State area. Only qualified applicants with broad experience. P-6595, Engineering News-Record.

Estimator—Engineering graduate with several years experience in estimating costs of oil refineries and chemical plants for contractor in Chicago area. Submit complete resume and photograph indicating education, experience and salary requirement. Box P-7614, Engineering News-Record, 330 W. 42nd Street, New York 36, N. Y.

Highway and Bridge designers and draftsmen. Positions open for men experienced in the design of highways and bridges. Long established Pennsylvania firm. Steady program of work. Usual employee benefits. Please submit information concerning education, complete experience, references, salary requirements, and availability. P-7615, Engineering News-Record.

Engineers—Experienced in design and preparation of plans for water works and sewerage systems and structural design. Advise education, experience, salary requirements and when available. Location Eastern New York. Reply P-7657, Engineering News-Record.

Architect—Qualified through training and experience to design churches, schools and other buildings. Give full information as to education, experience, salary requirements and when available. Location Eastern New York. P-7658, Engineering News-Record.

Engineer—Experienced at design and detailing of reinforced concrete and structural steel for highway structures. Location, Upper New York State. Please send complete experience record and salary required. P-7660, Engineering News-Record.

Graduate Civil Engineers not over 27 and single, or if married, willing to move. Must have military training completed and interested in learning building construction business. We offer opportunity for rapid advancement to ambitious, hard-working young men willing to accept responsibility. Starting salary $92.50 if unexperienced with higher rates for those with experience. Some engineers increase their salary 20% within one year. Send complete history data. Martin K. Eby Construction Co., Inc., 610 N. Main, Wichita, Kansas.

Wanted, Draftsman or engineering aide for city engineering department. Submit complete resume and salary requirements and earliest date available to City Engineer, City of Owosso, Michigan.

Structural Engineer for building design Ketchum and Konkel, Consulting Engineers, 1090 Fox Street, Denver 4, Colorado.

Superintendents and Foremen for firm utilizing all types of construction equipment. Must have extensive mechanical experience, proven ability to supervise operators and mechanics. Permanent locations, good starting salary and opportunity for advancement. Send complete details of background, experience and salary requirements to: Box P-7624, Engineering News-Record.

Estimator for established firm engaged in the engineering and construction of complete industrial plants. Should have at least five years experience in pricing labor and material on large scale industrial projects. Location, Pittsburgh. Please furnish resume of experience and training. P-7647, Engineering News-Record.

Municipal engineer for the Village of Ossining. General knowledge of water works, sewers, streets. Preparation of plans and specifications, etc. Mail resume with name, address and salary requirements. Ubaldo Marino, 6 Croton Ave., Ossining, New York.

Building Construction Superintendent — Wanted at once for large school project in Cedar Rapids. Must be well qualified and experienced. Project duration approximately two (2) years. Position permanent for right man. Write stating qualifications, habits, experience, previous employment, references, availability, and salary expected. Address reply to R. F. Ball Construction Company, Inc., Post Office Box 2300, San Antonio, Texas.

POSITIONS VACANT

Sales Engineer, with structural training for sales promotion of precast concrete building products in Western New York, calling on architects, engineers, contractors, for well known and long established firm. Write giving full qualifications, experience, and salary expected. P-7722, Engineering News-Record.

Connecticut Contractor, specializing in commercial and industrial building construction, looking for competent estimator, engineering background required. Must have extensive experience and be capable of assuming complete charge upon the eventual retirement of top official. Reply P. O. Box 1059, New Haven, Conn.

Experienced structural designers and detailers for work on reinforced concrete and steel highway structures with consulting engineers. Please give age, qualifications and salary requirements in reply. P-7462, Engineering News-Record.

Construction Superintendent—Engineer Govt. work. New organization desires to supplement key personnel. Opportunity for right person. Replies will be held in confidence. P-7766, Engineering News-Record.

Civil Engineer—For plan engineer position. Duties include sewer and water main design and field work. Salary range $385 to $460 per month. Apply City Engineer, City Hall, South Milwaukee, Wisconsin.

Engineer, Under 30, with experience in the design of heavy equipment installation and maintenance. Excellent opportunity for advancement with growing Southeastern division of national manufacturer of packaging materials. Now employ 600 with 500% expansion contemplated during next 10 years. Mechanical or civil engineering degree preferred. Starting salary to $6500, depending upon qualifications. Permanent position in small southern community. Send complete resume to P-7801, Engineering News-Record.

Wanted recent civil or mechanical engineering graduates, general field municipal water supply. Annual increase in salary and bonus. Profit sharing plan. Pitometer Associates, Engineers, 50 Church Street, New York City.

Wanted: Civil Engineer to serve as Assistant Town Engineer. Municipal experience desirable. Salary $5500.00. Wanted Civil Engineer. Recent graduate for municipal work. Salary $4500.00. Apply Town Engineer, Town of Fairfield 608 Jennings Rd., Fairfield, Connecticut.

Engineer, C.E.—Experienced. Shoring, underpinning, foundation. For supervising and estimating. N. Y. Area. P-7812, Engineering News-Record.

Engineers — Aeronautical (structures and power plant), civil, electronic—The Civil Aeronautics Administration urgently needs engineers to conduct development, applied research, experimentation, evaluation and testing programs and projects on electronic and other aids to air navigation, communication and traffic control; airport surfacing; aircraft structures, powerplants, instruments, appliances, safety devices and other components; and aircraft flight analysis, instrumentation and methods. Salaries range from $4345 to $7570 per year. Write or send application or Standard form 57, which can be obtained at your Post Office, to Personnel Officer, Civil Aeronautics Administration, Technical Development and Evaluation Center, P. O. Box 5767, Indianapolis, Indiana.

Position open for Chemical Engineer, 25-35 years of age, in branch operation of medium-sized company engaged in non-metallic mining, refining and processing. Must be capable of assisting the plant superintendent in all phases of the operation. Experience in both production supervision and pilot plant work not essential, but considered to be good background for this position. Considerable opportunity exists for capable, aggressive person. Salary open. Location Southwest U.S.A. P-7824, Engineering News-Record.

Draftsman—structural steel detailing experience. For interview send resume and salary requirement to Carl Wilsberg, Ch. Eng., The Standard Structural Steel Co., Box D, Station A—Hartford, Conn.

SELLING OPPORTUNITY OFFERED

Salesman, construction equipment, have exclusive New York City territory for one of leading dealers. Extensive experience necessary. RW-7721, Engineering News-Record.

POSITIONS WANTED

Civil Engineer, B.S.C.E. '54. Desires to relocate East or West coast with fabricator, contractor or consultant. Age 31, married. PW-7751, Engineering News-Record.

Civil Engineer—33, B.C.E. 6 years experience in steel erection and design. Have had responsible assignments in structural, plate, and pipe work, heavy machine installation and steel plant construction. PW-7715, Engineering News-Record.

Executive—Office Manager—18 years with heavy construction contractor, main office. Thoroughly experienced in all phases of office procedure—finance, insurance, payrolls, etc. A1 business and character references. Interested in connecting with progressive organization. New York Metropolitan Area. PW-7640, Engineering News-Record.

Superintendent—Maintenance 27 years experience in firebrick & chemical brick construction desires position in Western states. Oil refinery, chemical plant or steel plant. Apply to PW-7701, Engineering News-Record.

Bridge and Highway Engineer desires foreign position involving wide responsibilities. Thoroughly experienced in design, construction and supervision, possesses knowledge of many languages and ability to organize and train foreign personnel such as detailers, draftsmen etc. At present employed with large New York Consulting firm on foreign project. Available immediately. Request A. P. 862, San Salvador, Central America.

Civil Engineer—30—B.S.C.E. Seven years contractors man—large scale concreting bridge erection—docks—bridge piers in major rivers and deep cofferdams—also structural design experience and P.E. Well qualified for position as assistant superintendent, project manager or contractors walking boss. Can become estimator with short training period. Resume available. PW-7830, Engineering News-Record.

Mechanical Engineer field maintenance 10 years experience with exploitation, estimation of costs repairs of heavy construction equipment, concrete & earthmoving, aged 33, 5 languages, go anywhere. PW-7813, Engineering News-Record.

C.E. Age 41, experienced every phase building construction, heavy construction and management. Highest references. Available immediately. Location N. J. or Metropolitan N. Y. PW-7775, Engineering News-Record.

Civil Engineer, 30 yrs. sewerage systems, building layout, municipal and highway, desires position in New England or New York. Box PW-7776, Engineering News-Record.

Registered Civil & Structural Engineer in California. Experience of responsible charge in the design of bridges and buildings of all types. Desires managerial position in San Francisco Bay area. PW-7777, Engineering News-Record.

Building Construction Engineer, experienced banks, hospitals, office buildings new and alterations. Check estimates coordinate self-contractors, negotiate contracts. PW-7806, Engineering News-Record.

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National sales organization wants additional line of products to sell heavy equipment operators and dealers. Reply SA-7177, Engineering News-Record.

Your inquiry
will have
Special Value . . .

If you mention this magazine, when writing advertisers. Naturally, the publisher will appreciate it . . . but, more important, it will identify you as one of the men the advertiser wants to reach with this message . . . and help to make possible enlarged future service to you as a reader.

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Having experience with heavy material handling equipment

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Phone or Write
Chief Engineer for interview

THE WELLMAN ENGINEERING CO.
7000 CENTRAL AVE.
Cleveland 4, Ohio
Telephone EN 1-0842

WANTED

SUPERVISOR

OF CONTRACTOR'S EQUIPMENT

Replacement value approximately $2,000,000. Must have practical experience in proper use, care, maintenance and repair of all types of construction equipment. Will be required to maintain equipment records. Good opportunity with well established Midwestern firm which operates in about 12 states west of Mississippi River. Home Office in Lincoln, Nebraska.

Write full details as to qualifications, personal information, references, and salary required. Applications will be held confidential if desired.

P-7746, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

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Immediate openings for

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MECHANICAL
HIGHWAY-AIRFIELD
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ESTIMATORS &
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Must have degree (or equivalent) plus 6-10 years specialized exp.

MIN. TO $11,000 + OVERTIME

Airmail resume to
P-7757, Engineering News-Record
330 W. 42nd St., New York 36, N. Y.

ENGINEERS and DRAFTSMEN

Civil, Electrical, and Mechanical to work on large hydroelectric, irrigation, and multiple purpose projects. Good starting salary, liberal employee benefits. Please send complete resume and salary desired to

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400 West Madison St. Chicago 6, Ill.

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Construction Supts—with Gunite, Grouting and all around experience—Location East—Steady employment and high pay for capable men. Please send resume of experience. Our employes know of this ad.

P-7807, Engineering News-Record
330 W. 42nd St., New York 36, N. Y.

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HIGHWAYS AND BRIDGES

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Draftsmen
Office Engineers
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Project Engineers
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Instrumentman
Chainmen

OTHER PERSONNEL

Hydrologist
Equipment Supervisor
Master Mechanic

Domestic and Overseas Assignments
Knowledge of Foreign language necessary in some classifications.

Write giving full particulars concerning education, experience, personal history and availability to:

Richard L. Shaw
Personnel Director
Michael Baker, Jr., Inc.
Consulting Engineers
Baker Building Rochester, Penna.

STRUCTURAL ENGINEER

Masters Degree, Soils Mechanics preferable. 2 to 4 years soils investigations including exploration, analyses and design.

This is a permanent position of responsibility offering an unusual opportunity for the right man with a company known the world over for achievement in the petroleum and chemical industries.

Please send resumes to R. L. Stacom. Interviews will be arranged promptly.

M. W. KELLOGG CO.
225 BROADWAY NEW YORK 7

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Guam Project

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Graduate Engineer with at least 8 years' experience in design of structures, utilities and roads. Civil Engineer preferred.

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Must have degree in Electrical Engineering and 6 years' experience in design of power and distribution. Must be able to coordinate all electrical engineering work in field.

Write, giving detailed account of experience, education, etc.

BROWN-PACIFIC-MAXON
"Guam" Contract NOy-13941
P. O. Box 3316, Rincon Annex
San Francisco "19"—Calif.

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AT OUR

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and
—ELECTRICAL DRAFTSMEN
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TO UTILIZE YOUR ABILITIES AND
TALENTS AS A DESIGN ENGINEER

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Please Send Resume To:

Edward A. Kolner
ARTHUR G. McKEE & CO.
2300 Chester Avenue
CLEVELAND, 1, OHIO

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For young graduate Civil Engineers interested in future as highway design engineers. Training under competent highway specialists in expanding well-established firm.

Permanent positions now available. Some highway experience preferred but not required.

Excellent starting salaries, moving allowance, Blue Cross, paid vacations and holidays; sick leave, and voluntary employee benefit and retirement plan.

Write for application form.

SVERDRUP & PARCEL ENGINEERING CO.
1134 Locust St. St. Louis 1, Mo.

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The advertising rate is $20.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured 7/8 inch vertically on one column, 3 columns—30 inches—to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW ADVERTISEMENTS to N. Y. Office, 330 W. 42nd St., N. Y., 36, N. Y. for October 13th issue closing October 3rd.

STRUCTURAL ENGINEERING
ARCHITECTURAL ENGINEERING
OUR COURSES of instruction by mail HAVE HELPED THOUSANDS to better positions and to pass State Board Examinations. *Forty-fourth year. Write today.*
WILSON *Engineering Corp.*
College House Offices—HARVARD SQUARE, CAMBRIDGE, MASS.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

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Practicing Engineer desires to purchase substantial interest in a Florida Engineering and Surveying Corporation. Address BO-7464, Engineering News-Record.

For Sale—Well established surveying practice enjoying reputation for quality work in growing Florida community of sound economy. Excellent opportunity for single owner to net $7000.00 per year on an investment of less than $10,000.00. BO-7749, Engineering News-Record.

Desire to contact utility contractor, preliminary to bidding large housing project in mid-south location. Water lines, gas lines, storm and sanitary sewers, approximately half million dollar sub-contract. BO-7828, Engineering News-Record.

Engineers—Foremen—Office Men

Learn latest methods to organize and run work. Prepare for the top jobs.

Send post card for details.

GEO. E. DEATHERAGE & SON
CONSTRUCTION CONSULTANTS
P.O. Box 921 Lake Worth, Florida

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RENT • REPAIRING

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FINE RENTAL INSTRUMENTS

Reasonable rates, on monthly or yearly basis. All instruments guaranteed to be in first class condition.

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Milwaukee 12, Wis.

GURLEY

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Send your instrument to the factory for repair, rebuilding, adjustment. Write today for "Repair Service" leaflet.

W. & L. E. Gurley, Dept. R, Troy, N. Y.

WANTED

NEW or GUARANTEED USED:

Four 250 HP Electric Motors, 1800 RPM, 3-phase, 60-cycle, 440 volts, part winding increment start.

Four 200 HP Electric Motors, 1800 RPM, 3-phase, 60-cycle, 440 volts, part winding increment start.

Four 250 HP, 3-phase, 60-cycle, 440 volt part winding increment starters with disconnect and start-stop buttons in cover.

Four 200 HP, 3-phase, 60-cycle, 440 volt part winding increment starters with disconnect and start-stop buttons in cover.

W-7686, Engineering News-Record
1111 Wilshire Blvd., Los Angeles, Calif.

WANTED
CRANES
WANTED

Manitowoc Cranes
3000—3500

DONALD B MAC NEAL INC.
12100 So. Loomis Chicago 43, Ill.

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Used 2½ yd. SHOVEL
Northwest, Bucyrus Erie or Lorraine
also
Shovel attachment for Northwest
WILLIAMS CONSTRUCTION COMPANY
Box 145, Baltimore 20, Md.
Murdock 6-6600

WANTED
CRAWLER CRANES

2-½ to 2 cu. yd. crawler cranes, diesel pow. must be late models. Prefer long cats. In replying state make, model, serial model, age, price, where it can be inspected.

W-7711, Engineering News-Record
520 No. Michigan Ave., Chicago 11, Ill.

WANTED TO BUY FULL AUTOMATIC CONCRETE BATCHING AND MIXING PLANT To Produce Upwards of 350 Cubic Yards Per Day, Give Full Description In Detail, Also Make, Model, Age, How Much Plant Has Been Used, Shipping Weight, Location For Inspection, Price F.O.B. Cars.

W-7800, Engineering News-Record
520 No. Michigan Ave., Chicago 11, Ill.

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Serial #328865, equipped with 14" crawlers, 16" tread, Cummins engine, 24'6" boom, 18" dipper, Torcon torque convertor. Machine like new. Can be inspected any time.

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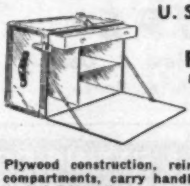

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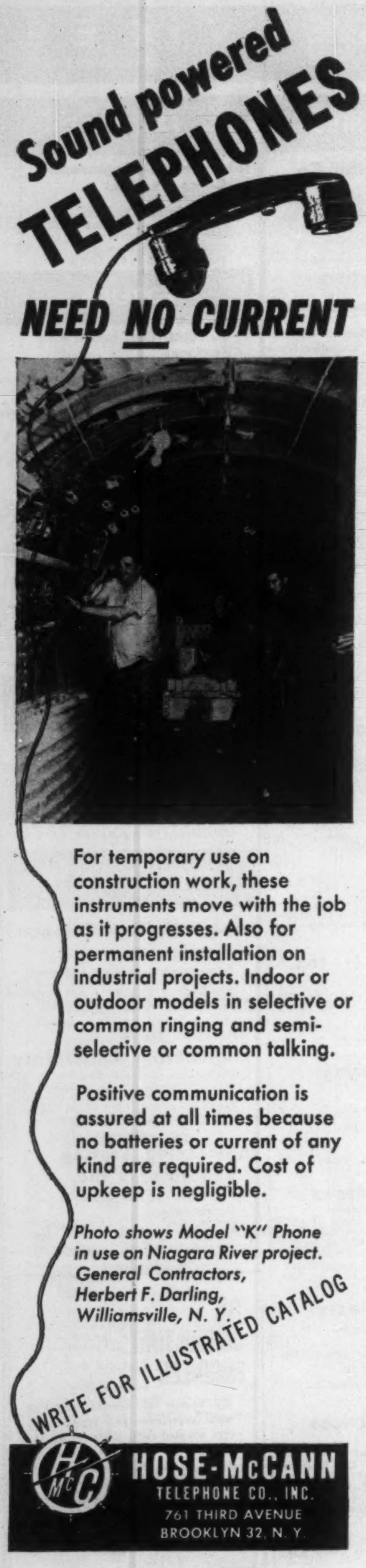

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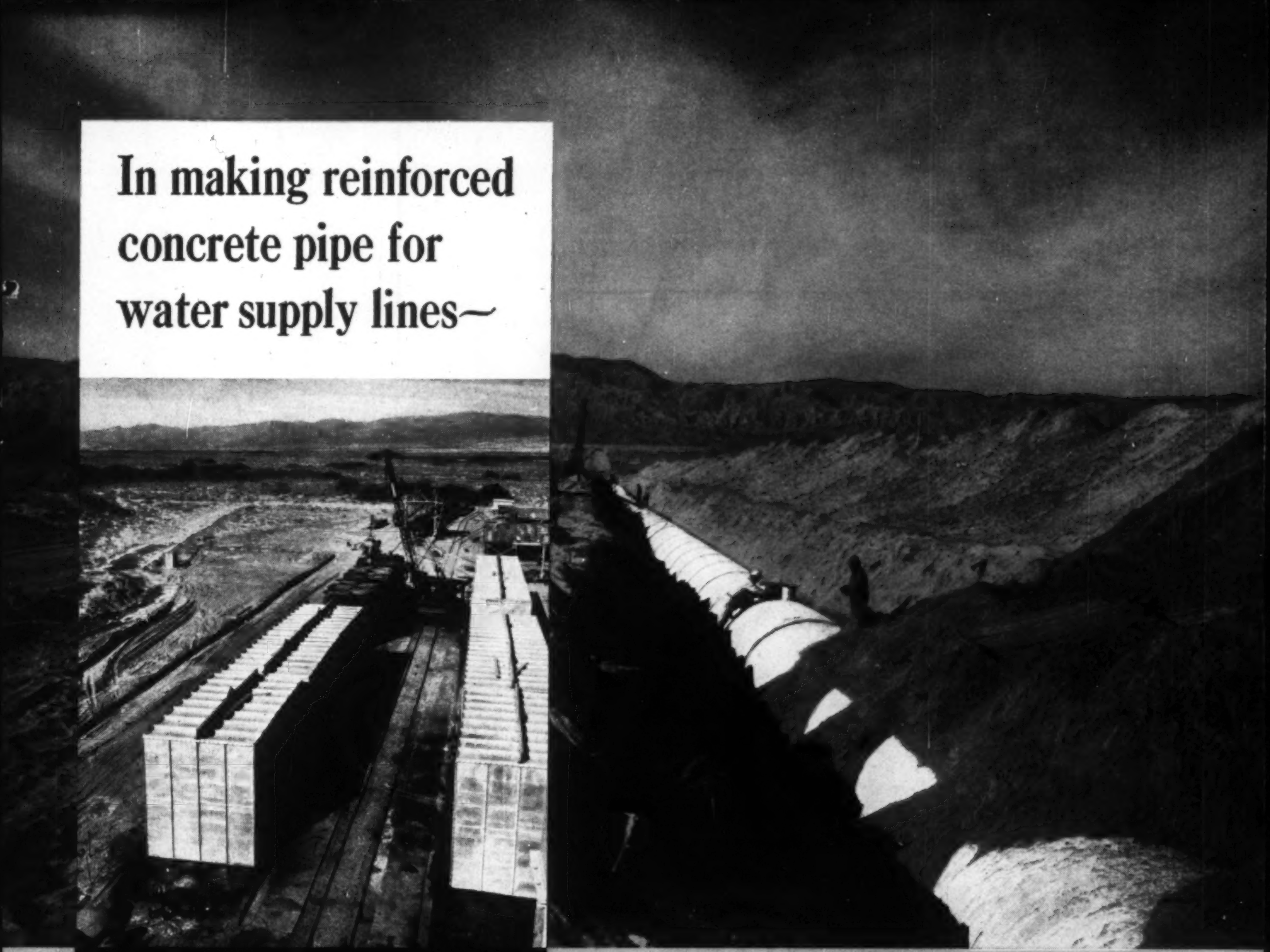

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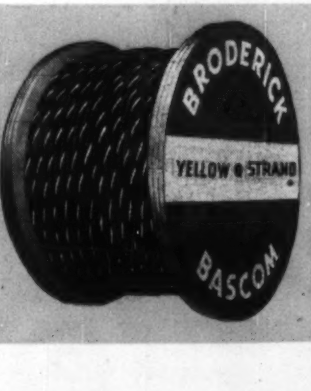655 Edmunds St., Seattle 8, Wash.
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